THE BOOK of KNOWLEDGE

BLOSSOMS

SEA SHELLS

These two beautiful pictures were painted by Albert Moore, the British artist whose decorative pictures are famous. "Blossoms" hangs in the National Gallery of British Art, and "Sea Shells" is reproduced here from a photograph by Caswall Smith.

The Book *of* Knowledge

The Children's Encyclopædia

EDITORS-IN-CHIEF

ARTHUR MEE
Temple Chambers, London

HOLLAND THOMPSON, Ph. D.
The College of the City of New York

WITH AN INTRODUCTION BY

JOHN H. FINLEY, LL. D.
Late President of the College of the City of New York
Commissioner of Education of the State of New York

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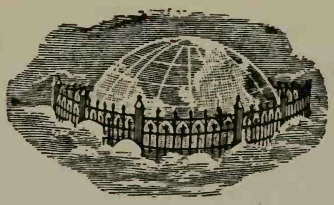

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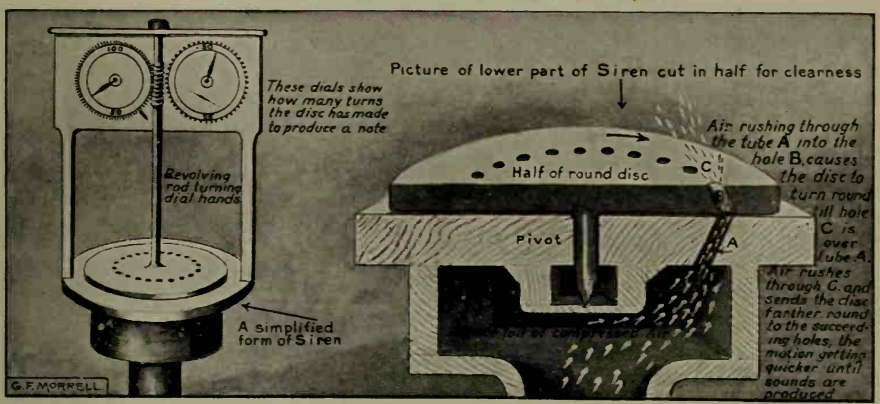
These dials show how many turns the disc has made to produce a note
Revolving rod turning dial hands
A simplified form of Siren
Picture of lower part of Siren cut in half for clearness
Air rushing through the tube A into the hole B, causes the disc to turn round till hole C is over tube A.
Half of round disc
C
Pivot
A
Air rushes through C and sends the disc farther round to the succeeding holes, the motion getting quicker until sounds are produced
G.F. MORRELL

This shows how the siren works. As the disk revolves, the holes are brought in rapid succession over the tube A, and puffs of air pass through these holes and produce a loud sound. The dials record the turns of the disk, from which the number of puffs and sound waves can be calculated.

WONDERFUL, WONDERFUL MUSIC

CONTINUED FROM 4872

THE great art of music, though it is an art meant to be beautiful and to move us, is a strict science having perfectly definite laws based upon the facts of sound. The siren—about which we read on page 4872, helps us in the study of what is called harmony.

The music of long ago consisted entirely of melody—that is to say, tunes which are usually very simple, and have only one note sounded at a time. We know, however, that it is very pleasant to the ear sometimes to hear two or more notes sounding at one time; we know, also, that sometimes it is very unpleasant. When the sound is pleasant, we call it a harmony; but when it is unpleasant, we call it a discord.

The greater part of the progress in modern music depends upon the progress in harmony, and all present-day lovers of music would be very sorry to have to be limited to melody alone, now that it is possible to add so much to it by means of harmony. Without harmony we could not have the great orchestras whose music we so much enjoy.

It is extremely interesting to discover, if possible, what makes harmony and what makes discord. The difference to our ears is very great, and there surely must be some rule that materially affects the nature of the sound, if only we could find out what that rule is. Again, it is very interesting to notice that there are certain kinds of harmony where the notes sounded together seem so much alike that we do not even speak of them as making a harmony. For instance, one C on the piano and the C above or below are certainly not the same note, yet they are so like each other that when they are sounded together it is very much the same as if we were listening to one of them, only the sound is much richer and fuller.

Now, we might very easily suppose that our feeling that there is a sort of likeness or family resemblance between notes would depend on their being near to each other. Yet a C sounds very like another C, even, perhaps, two or three octaves away, and intensely unlike a note next to it, such as B or C sharp This we soon notice if we sound two notes next to each other together. All ears are quite agreed about this, and there must be some explanation of it.

If we make a new kind of siren,

as a German student has done, and use four sets of holes instead of one set, having a different number of holes in each set, we have in this "many-voiced siren," as it is called, a very convenient way of studying harmony. The subject of harmony is one upon which many large books have been written. Every student of music should learn something about it.

It is really as much a science by itself as the study of the rocks or the study of the stars, and men who want to know all they can of it require to devote their whole lives to it. But everyone can understand the first great fact about harmony, and the difference between harmony and discord.

WHY TWO NOTES THAT ARE SEPARATED SOUND EXACTLY ALIKE

For instance, we can arrange the many-voiced siren in just such a way that it gives out two notes, one made of exactly twice as many puffs as the other. It does not matter at all how many the puffs actually are—that is to say, it does not matter whether the notes are high-pitched or low-pitched—so long as the one note is made of twice as many puffs as the other; the one will always be the octave of the other. They will sound like two C's next to each other on the piano. Now, these two C's are really separated by a large number of notes, and yet they sound more like each other, and form a closer harmony, than any two notes much nearer together. Our experiment with the siren has given us the key to this, and to the whole of harmony.

The great law is that the ear judges by relations, or, to use the proper word, *ratios*. When we compare any harmony with any discord, the difference is in the ratios, or relations, between the numbers of the notes. We know that every possible musical note means a definite number of air waves striking the ear in a single second of time.

THE IMPORTANT FACT UPON WHICH ALL MUSIC DEPENDS

It is upon the relations between those numbers that all harmony and, indeed, all music depends. The simplest possible relation between two numbers is plainly the relation of two to one. Nothing else could be quite so simple as that, unless the two numbers are actually the same. Now, our experiment with the many-voiced siren teaches us that this relation of two to one gives our ears the impression of the closest resemblance and harmony that are possible. Two notes making an octave have this relation between them, and no matter whereabouts in the scale we take them, high or low or in the middle, they will always have the same effect upon the ear. One note may have 24 vibrations a second, and the other 48, or the numbers may be 25 and 50, or 15,001 and 30,002, yet, whatever the actual numbers are, the ratio of them is as one to two, and so to our ears the one sounds almost like the "double" of the other.

All modern music is based upon this fact, and, by filling in the interval between the one note and the other with a varying number of other notes chosen in a certain way, we form what is generally called a scale.

Nothing would be easier than for a player on the violin to play a scale or any number of scales which we should call simply hideous. On the other hand, there are certain scales which the ear likes very much. Some of them have the effect of being mournful, and some of being untroubled or even gay.

THE MUSICIAN'S A B C, THE SCALE OF NOTES UPON WHICH ALL MUSIC IS BUILT

Ever since music began, and in all parts of the world where it has existed, it has depended upon the use of a scale or set of notes. For instance, one set of notes was used long ago in England and in Scotland, certain sets were used in Greece, and certain sets are used to-day in India and Japan.

In every case the particular set or sets of notes make up the material or alphabet of the musician. A clever musician can at once tell, when he hears a tune like one of the beautiful old Scottish or Irish tunes, to what period it belongs and from what place it comes, because he immediately recognizes the scale from which the composer has chosen his notes.

Let us first look at the ordinary scale that we can play on the piano by simply touching the white notes from C to C. To our ears, accustomed from our earliest years to hear this scale, and to hear tunes made from it, this sounds natural, and any other scale at first sounds rather peculiar, and less natural. But every musical scale has its definite laws, always

to be found by studying the vibration numbers of the notes that make it. To this we must add that the numbers themselves are of no importance; the whole point is the relation between them. Any kind of scale may start on a note of any number, but all the other notes in the scale will have a fixed relation to that number, and those relations make the scale. We shall recognize it, and it will have the same effect upon our ears, whether it is played in a low key or a high one; it will really be the same scale, whether played by a bassoon or a flute or a violin. What it is that makes the difference in these cases we shall afterwards study.

THE RELATION BETWEEN THE DIFFERENT NOTES OF THE SCALE

It is quite easy to write down exactly the ratios of all the notes in the ordinary scale of C major, which most of us know so well. Let us suppose, just for the sake of the argument, that the lower C happens to have a vibration number of 24 per second; it might just as well be 25 or 250½ per second. But 24 is a convenient number, and, if it be 24, then we can find out exactly what all the other numbers will be. Here they are set out in order and showing their relation:

C	D	E	F	G	A	B	C
24	27	30	32	36	40	45	48

Now, there is no point in these numbers themselves, but there is all the point in the relation between them. The first thing we notice, of course, is that the ratio between the two notes that make the octave is the ratio of 24 to 48, and that is the ratio of 1 to 2. The next simplest ratio that we can notice is that of C to G, for C is 24 and G is 36, so that the ratio is that of 2 to 3. One more ratio we may note, and that is the ratio of C to E, which is that of 24 to 30, or 4 to 5. Now, if we take these notes that we have observed, C, E, G, C, we find, to begin with, that they make the common chord, the sound of which we all know so well, for most pieces of music end with it. If it comes in the middle of a piece of music, we are apt to think that we have reached the end.

THE COMMON CHORD THAT MOVES MEN ALL OVER THE WORLD

That is the peculiar quality of this wonderful chord; it sounds final. After other combinations of notes the ear expects more. But the ear is always content with this; it requires nothing to finish it or to carry it on. Now, in the case we have chosen, the vibration numbers of these four notes are 24, 30, 36, and 48. If we reduce these, we see that the ratios are those of 4, 5, 6, and 8. Now, it does not matter where we hear a common chord, or what note it starts on, the ratios of the four notes making it are always those of 4, 5, 6, and 8.

This is really very wonderful. If we look at 4, 5, 6, and 8 on a piece of paper and study them, we are studying arithmetic, a simple branch of mathematics. As everyone knows, this science of numbers and figures is to many people the driest and most abstract in the world, yet its laws apply directly to some of the deepest and most wonderful feelings of which we are capable. Considered in themselves, the ratios 4, 5, 6, and 8 are quite dry; they seem to have nothing to do with mankind. Yet all over the world, in all ages, men have only to hear this ratio made in sound waves, and they always get a certain set of definite impressions.

First, the ratio means music as distinguished from noise; secondly, it means harmony as distinguished from discord; and, thirdly, it has the peculiar quality of saying, "This is the end," not merely pleasing the ear, but satisfying it.

THE WONDERFUL RELATION BETWEEN ARITHMETIC AND MUSIC

If we went farther into the matter, we should find that there are other ratios which always tell the ear that there is more to follow, and which make the ear positively long for what is to follow; yet the absolute difference between these two qualities depends upon abstract arithmetic—the difference between the ratio of one set of numbers and the ratio of another set of numbers.

These simple facts, so well known to all musicians and students of sound and of the ear, are full of the highest meaning if we have wisdom to see it. Anyone who had not thought wisely and deeply about the world would have supposed that no two things could be farther apart than, on the one hand, our feelings of yearning and satisfaction or sadness and joy, and, on the other hand, the arithmetical ratios between a certain set of numbers. Yet these two utterly different and unrelated things, as they seem to be, are eternally bound together by the laws

of Nature and of man. Let us now print again the notes of the scale and their vibration numbers in the case where we happened to start with 24, and underneath these let us print the ratios of the numbers:

C	D	E	F	G	A	B	C
24	27	30	32	36	40	45	48
1	$\frac{9}{8}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{3}{2}$	$\frac{5}{3}$	$\frac{15}{8}$	2

We notice that these fractions vary in simplicity. The simplest is the fraction corresponding to G, and the next simplest is that of E, which is just halfway between C and G. These give us the common chord. It is very interesting to notice that one fraction in the above list is very decidedly less simple than any of the others—that is the fraction $\frac{15}{8}$, which corresponds to the note B in the scale of C.

Now, we are all quite able to sing a scale, and it is quite natural to us to strike the last note but one, which in this case is B. But when we have noticed that this ratio is really the least simple of them all, it is very interesting to learn from the history of music that this particular ratio had to be discovered.

THE NEW MUSICAL NOTES THAT WERE DISCOVERED IN RECENT TIMES

It appears that, to whatever part of the world we go, we find a time when the ears of musicians had not discovered this ratio as a way of getting from A to C. So they stopped at A. Very often, also, they had not discovered the ratio $\frac{4}{3}$, which corresponds to F. So it was that they had simply a scale made of five tones—C, D, E, G, A. This is the very famous five-tone, or *pentatonic*, scale, which we may say was the great scale of music until comparatively recent times, and the discovery of F, and more especially of the difficult ratio B, from which the scale can climb to a note exactly double of the note it started with, and so become beautifully finished.

There is no end to what might be learned about the different kinds of scales, but what has been said gives us the key to the wonderful facts; and we discover that music, this great art which, at its best, affects us so deeply and nobly, may really be looked upon as a branch of applied mathematics, an application of the laws of the ratios of numbers.

When we are playing a scale of any kind on the piano or on the violin, or when we are singing it, perhaps one of the notes we make sounds quite wrong, and we say that it is out of tune. What does this mean? There is nothing the matter with the note itself, remember, though, occurring where it does, it sounds so unpleasant that we are quite likely to think so. It may in itself be a lovely note, rich and clear, brilliant or tender. Nevertheless, where we hear it—perhaps in a scale or in the course of a song or a piece—it is simply dreadful.

WHAT HAPPENS WHEN THE PIANO IS OUT OF TUNE

The reason is that the vibration number of that note has not the ratio it should have to the other notes. It is out of tune with them, or we might say that they are all out of tune with it. Anyhow, the ratio is wrong. If it is wrong because the vibration number is too small, we call the note flat; if the vibration number is too high, we call the note sharp.

One of the commonest mistakes in singing and in playing the violin is to make the notes flat. No matter how beautiful the voice or the tone of the violin, no matter how expressively played, no matter how good the rhythm, how well judged the varieties of time or anything else, no one can forgive music that is out of tune. Everything else may be right, but if the arithmetic is wrong the result is not music, but simply a miserable parody of it which is painful to the ear.

It is right to ask what is the meaning of the black notes on the piano, lying here and there between the white ones that make the scale of C. What has happened is that, in the course of the development of music, the first great stage in the development of a scale has yielded to a second. The first great stage was when the five-note scale was improved into the ordinary scale we know so well. We are quite right to say improved, because nothing was lost in the process. The five-note scale is still there, of course, included in the other.

HOW FIVE NEW NOTES WERE ADDED TO THE ORDINARY SCALE

The next great stage was to add five more notes at certain places in between pairs of the notes of the ordinary scale. If now we play all these notes in order on any instrument, we get exactly the same sound and result as when we play all the notes on the piano, one

after the other, including the five new black notes with the older white ones.

The arrangement of this new scale is such that the distance between any two notes is much less than it is in the simpler scale. For instance, if we look at our table, at E, F, and G, we see that from E to F it is only half as wide a space as from F to G. Well, in the new scale with the black notes, a black note, which we call F sharp, has been put in between F and G, so that the intervals from E to F, from F to F sharp, and from F sharp to G are equal. The older scale, made by the white notes, is known as the *diatonic* scale, and the newer one with the black notes included is called the *chromatic* scale.

If now we compare the three scales, pentatonic, diatonic, and chromatic, we can understand something of the development of music. Not a very great amount of variety can be yielded by the oldest simple scale. This is not to say that the results may not be lovely, because they often were; only they were limited. It is this lack of variety that makes the difference between the diatonic scale and the chromatic scale.

THE KIND OF TUNES THAT CHILDREN LIKE AND UNDERSTAND

During the last hundred years or so, the chromatic scale has been used to a greater extent as the basis for composition. It is easy to understand that when children are learning music, the tunes they enjoy and understand first are based upon the simpler scales. Practically everyone enjoys these tunes, but it is only a comparatively small proportion of people who care for tunes built on the chromatic scale. Some people will say of a modern piece of music that there is no tune in it, but others, whose ears are better developed musically, know very well that there may be tunes in the newer music as well, only they are built upon a less simple scale.

If we chose to write all music down in the form of arithmetical ratios, which might be done, it could doubtless be shown how people can be classed according to the development of their musical ear by nature and education, beginning with those who can follow simple ratios like 2 to 1 and 3 to 2 and 5 to 4, and ending with those who can follow the more difficult ratios that are used so much in modern music. The siren is a kind of wind instrument, the music being made by puffing wind or air through the holes. But everything that can be proved by the siren, and that is true of the siren and of all wind instruments, is equally true of string instruments. Sound waves happen to be produced in a different way in the two cases, but all the wonderful laws as to their ratios are the same.

THE SECRET OF THE FIDDLE AND ITS STRINGS

String instruments are so valuable in music, and the behavior of stretched strings is, in any case, so interesting that it has been carefully studied. If we look at a violin and notice how it is used, we shall see that there are three facts about a string which decide the rate at which it vibrates.

To begin with, we notice that the strings which make the lower notes are thicker than those which make the higher. This is because of the law that the rate of vibrations of a heavy string is less than that of a light string. The heaviness, or, rather, the mass, of a string will depend partly upon the density of the material and partly upon the thickness of it. Secondly, we notice that it makes a difference to the violinist how tight his strings are.

When he tunes his instrument he is turning the pegs which decide how tight the strings shall be. The tighter the string, the more quickly it vibrates, and the higher the note becomes. If we increase the tightness by 4, the string vibrates twice as often; if by 9, it vibrates 3 times as often—4 being 2 multiplied by itself and 9 being 3 multiplied by itself. That is the law for all cases.

Lastly, we notice that when the violinist plays, he is constantly moving the fingers of his left hand and pressing upon the strings. This is simply the most convenient way of altering their length, because when he presses upon or stops a string at any point it is just as if the string stopped there altogether.

THE NOTE THAT IS DIFFERENT ON DIFFERENT INSTRUMENTS

We also notice that when he is playing high notes his fingers come farther and farther down, so as to make the strings shorter and shorter. The shorter the string the higher the note.

There is a deeply interesting question which we have not yet discussed at all. Let us suppose that the C of the piano is 24, as we did before. Now, we may

have an organ and a violin and a voice, and many other kinds of instruments, all sounding this same note, and yet the sounds are very different. Everyone would instantly know which was the note made by the violin and which was the note made by the piano.

THE MUSIC OF THE SIMPLE WAVES AND THE MUSIC OF THE MIXED WAVES

Clever people, too, can tell one piano from another, and it is often easy to tell one violin from another, and we can all tell the voice of one friend from that of another; that is true even though it is the same note that is being sounded in all these cases, and it is very interesting for us to discover where the difference lies.

To begin with, there are some kinds of musical instruments where the differences are not to be found. Tuning-forks, for instance, professing to sound the same note, really do sound the same note—without the difference that there is between a cheap violin and a good one. On careful study we find the reason for this difference. In the case of a tuning-fork, the sound waves are perfectly simple; but in the case of a violin or a voice or a piano or an organ-pipe, it is rather as if the waves were like big billows of the sea with little ripples on them, and with perhaps tinier ripples on these ripples, if our eyes could see them.

Now, it makes a very great difference to our ears whether sound waves are simple, like a line simply waving plainly up and down, or complicated, with all sorts of smaller waves mixed up with the main wave. All the sounds that are valued in music are made up of these mixed waves. The main wave is called the fundamental note or tone, and all the other smaller waves which go with it are called over-tones or harmonics.

WHY DIFFERENT INSTRUMENTS MAKE DIFFERENT SOUNDS

These over-tones are equally interesting to the student of sound and to the student of music. It is the quality, the number, and the relative loudness of the over-tones that make the difference between one instrument and another, and one voice and another, even though they are all sounding the same fundamental note. This means that nearly all the musical notes we hear are really not single notes so much as combinations of notes. They are really harmonies, only we scarcely notice them as such because the lowest note of the chord is so very much louder than all the others; yet they are, and they make all the difference between the sound of the violin or of the piano, the voice of one friend and that of another.

The great interest of music written for various instruments and for various kinds of voices consists in the endless variety that we are able to get by using one instrument with another kind of instrument which has different over-tones. Whatever the instrument employed, we desire that its over-tones shall be many and rich and harmonious. This is most notably true in the case of the violin and the human voice.

We all know that some violins, made many years ago, are worth thousands of dollars, while others may be worth as many cents or less, because, no matter whether we have the same player, the same bow, and the same strings in the two cases, the one violin will make a rich, lovely musical tone, and the other a thin, scratchy noise which would scarcely be called music by anyone.

THE SECRET OF THE WONDERFUL FIDDLES OF OLDEN DAYS

All this is wholly a question of over-tones. Somehow or other, one and the same string, played by the same bow, by the same hand, in the same room, produces lovely tones or ugly tones in the two cases, though the name of the note is the same.

There is something, then, about the body of the violin which makes all the difference, and this is now understood. The string is making not only the big main wave itself, but also the little waves. The secret of making the sound lovely is to have near the string something which can be made to vibrate when the string does, and it must be something which has the power of picking out from the string-waves just those over-tones which the ear likes best; then the tone will be enriched. In the wonderful violins of old days, the front and the back of the body seem to be made of exactly such size and shape and curvature and thickness that they both resonate in just the same way and to just the same notes. They help each other instead of fighting against each other, and that is their secret.

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THE STORIES OF JULES VERNE

JULES VERNE, the famous French writer of imaginative tales, was born at Nantes on February 8, 1828, and died at Amiens on March 24, 1905. He wrote a large number of stories in which he made use of existing inventions by imagining how they might be developed to alter the course of life. We are to read two of these here, the first of which involves no extraordinary inventions. The hero is an Englishman; but the author makes many comic errors, for the fact that he could make an Englishman mistake a Saturday in London for a Sunday is sufficient to show how little he knew of English life. It is now possible to make the tour of the world in half the time that Phileas Fogg took, so much has the speed of railway and steamship traveling increased since the story was written, in 1873. There is a brisk and sustained movement throughout the narrative which makes up for much that is crude and improbable.

ROUND THE WORLD IN 80 DAYS

CONTINUED FROM 4755

IN the year 1872, the house at No. 7, Savile Row, London, was inhabited by Phileas Fogg, an eccentric member of the Reform Club of London. Although unmistakably an Englishman, he may not have been a Londoner, but it was certainly many years since he had been absent for any time from the daily routine of his life in London. He lived quite alone, and never had a visitor. A single servant attended to all his domestic wants. And as he required of this servant a degree of punctuality and regularity almost beyond an ordinary human being, he had some difficulty in keeping even one servant.

It was October 2, and Mr. Fogg had just discharged his servant because he had brought him his shaving water heated to 84° Fahr. instead of 86°. He now awaited the appearance of his new servant, who was due between eleven and half-past eleven. At that moment the discharged servant ushered his successor into the room. The name of the new comer was Jean Passepartout, and he was a stout Frenchman of some thirty years.

"You have been recommended to me," said Phileas Fogg, "and I have some good testimonials concerning you. You know my conditions?"

"Yes, sir."

"Good. What is the time by your watch?" Phileas Fogg continued.

"Eleven twenty-two," replied Passepartout, drawing from the depths of his watch-pocket an enormous silver watch.

"You are slow," said Mr. Fogg.

"I beg your pardon, sir, but that is scarcely possible."

"You are four minutes slow," continued Mr. Fogg; "but it does not matter so long as you know it. And now, from this moment, eleven twenty-nine a.m., Wednesday, October 2, 1872, you are in my service."

So saying, Phileas Fogg rose up. Taking his hat in his left hand, he placed it on his head with a curious automatic movement, and left the house without another word. After he had placed 575 times his right foot before his left, and 576 times his left foot before his right, he arrived at the splendid building of the Reform Club. In the dining-room there he took his regular place at his regular table, where his regular lunch was ready for him. At 12.47 he rose and went into the reading-room, where one of the waiters gave him a copy of "The Times" newspaper, the reading of which occupied him until 3.45, when he took up "The Standard," and read that until dinner. At 5.40 he was back again in the reading-room, engrossed in "The Morning Chronicle." Half an hour later he was joined by several members of the club who were his particular friends

and his regular partners in a game of cards that they played every evening.

"By the way," said one of these—Flanagan, a rich brewer—"what's the latest about the robbery?" addressing Mr. Ralph, a director of the Bank of England.

"The Bank will lose its money, I fancy," remarked Mr. Andrew Stuart, the famous engineer.

"On the contrary," replied Mr. Ralph, "I hope we shall soon lay hands on the thief; and as all the ports are being carefully watched, he will find it difficult to escape from the country."

A GREAT BANK ROBBERY, AND THE ESCAPE OF THE ROBBER

"'The Morning Chronicle,' considers that the person who has taken the £55,000 in banknotes is no ordinary bank-robber, but will be found to be a man of some position."

With this observation, Phileas Fogg emerged from the folds of "The Morning Chronicle," and was greeted by his friends. The conversation concerning the bank robbery was continued, and many theories were discussed as to how the thief might make good his flight.

While some of the gentlemen considered the world was so large that one could easily get beyond the reach of the law, Phileas Fogg maintained, in his quiet way, that the world was no longer large, and the bank director agreed in thinking that the means of transit had made the world a much smaller place to live in. Thus it was that they came to discuss, as they played at cards, how long it would take to go round the earth.

Three months was held to be the time required, but Phileas Fogg maintained that eighty days would be sufficient. Stuart, the engineer, offered to wager £20,000 that it was impossible. Phileas Fogg asserted that he was ready to start at once, and prove that he was right—that very night, in fact.

MR. PHILEAS FOGG MAKES A WAGER OF $100,000 IN STRANGE CIRCUMSTANCES

To show his confidence, he said he would risk $100,000 of his fortune on the venture, staking that sum against anyone who cared to accept the wager, and agreeing to pay it over if he did not make the tour of the earth in eighty days or less. His five fellow-clubmen accepted the wager, and Mr. Fogg warned them that he would make the tour at their expense.

"Now that's settled," said Mr. Fogg. "I find that a train leaves for Dover at 8.45 to-night; I shall travel by it."

"This very evening?" exclaimed Stuart, in a tone of great surprise.

"This very evening," replied Fogg, as coolly as though it were a matter of going to the next street. Consulting his pocket calendar, he continued: "As this is Wednesday, October 2, I ought to be back in the reading-room of the Reform Club on Saturday, December 21, at 8.45 p. m., in default of which the £20,000 now lying at my bankers' will belong to you gentlemen."

Seven o'clock struck as he was speaking, and his friends offered to stop the game so that he might make his preparations for departure, but this he declared unnecessary, as he was always ready, and he continued playing till 7.25, when he said good-bye to his friends and left the club. Twenty-five minutes later he opened the door of his house and found Passepartout awaiting him.

"We have to leave in ten minutes for Dover and Calais," he said, "as we are to go round the world in eighty days, so there's not a moment to lose."

THE SURPRISE OF PASSEPARTOUT, AND HOW THE GREAT TOUR BEGAN

The calmness with which he imparted this information to his new servant left that worthy Frenchman almost breathless with amazement. He suggested some of the usual preparations for travel, but his employer dismissed them all by saying that they would take no luggage beyond night-clothes, a shirt or two, and three pairs of socks. Anything else would be bought on the way.

By 8 o'clock Passepartout had made this simple preparation, and after carefully shutting up the various rooms he found his employer ready. Into the traveling-bag Mr. Fogg thrust an enormous bundle of banknotes, telling Passepartout to be careful of the bag, as it contained no less than $100,000. Thus they left the house, Passepartout carrying the bag and Mr. Fogg's waterproof and traveling-rug. The front door was double locked, and crossing to the cab-stand they hired a cab and drove rapidly to Charing Cross Station. At the station the five friends of Phileas Fogg were present to see him off, and he explained

to them that he had a passport which he would get witnessed at every important place on his route as evidence of his journey. At 8.45 the train steamed out of the station; the journey round the world had begun.

Seven days later, while people were waiting at Suez for the arrival of the mail steamer Mongolia, two men on the quay were in earnest conversation. The one was the British consul, and the other a thin little fellow, with an intelligent but somewhat restless face, whose eyes seemed never at rest. This man was Fix, one of the many detectives sent out to the chief ports to track the author of the bank robbery, the discussion of which had led in so singular a way to Phileas Fogg's tour of the world.

This Fix had a notion that the robber might have chosen a new way to make for America, instead of taking any of the western routes, and might, traveling eastward by way of India and Japan, reach America by the least likely route.

MR. FOGG IS SUSPECTED, AND FIX, THE DETECTIVE, BEGINS A LONG CHASE

The Mongolia was only to stop for a short time at Suez and continue her voyage direct to Bombay. As the passengers came off they were all carefully watched by the detective, and Passepartout, having been sent ashore with Mr. Fogg's passport to have it witnessed, raised his suspicions. It was necessary for Mr. Fogg to present the passport himself if he wanted the consul to witness it, and thus Mr. Fogg had himself to come ashore for the purpose.

The consul pointed out that there was no need whatever for a passport, but Mr. Fogg explained that he desired to have it witnessed wherever he went. Now firmly believing that he was on the track of the bank-robber, for whose arrest a substantial reward had been offered, Fix decided he would follow Mr. Fogg to Bombay, and immediately took passage in the Mongolia.

On the way to Bombay, Fix endeavored to secure as much information as possible about this Phileas Fogg from his valet, and, Passepartout being of a frank and jovial nature, the detective had little difficulty in learning the truth. But the truth he naturally mistook for a lie, and supposed that the pretended tour round the world was merely to throw detectives off the scent. He hoped that the warrant for the arrest of the robber would arrive soon after they arrived at Bombay, and he would put an immediate end to the travels of Mr. Phileas Fogg. But it so happened that the Mongolia made a much quicker passage than usual, and reached Bombay on October 20, two days ahead of her time. The order of arrest had not arrived, of course, but Fix determined not to lose sight of the mysterious scoundrel who was now almost within his grasp.

PASSEPARTOUT HAS A STRANGE ADVENTURE IN BOMBAY

The travelers had only been an hour or two in Bombay when Passepartout involved both Mr. Fogg and himself in serious trouble. Sent to make some purchases, he wandered into one of the great Hindu temples without having first taken off his boots, and on being turned out by the priests, who forcibly removed his boots, he dealt very roughly with them before he took to his heels, followed by an angry crowd. He only got to the station a few minutes before the train was due to leave. His employer was waiting for him, and as Passepartout explained breathlessly the cause of his delay he was overheard by Fix, who had determined to keep Fogg under close observation by traveling with him in the same train to Calcutta.

Passepartout occupied the same compartment as Mr. Fogg, but there was a third traveler in the opposite corner. This was Sir Francis Cromarty, a brigadier-general, who had traveled with them from Suez to Bombay, and was now on his way to take up his military command at Benares.

MR. FOGG PAYS $10,000 FOR AN ELEPHANT TO CONTINUE HIS JOURNEY

The officer became friendly with Mr. Fogg and also with Passepartout, whose great silver watch he found was still regulated according to Greenwich time. Sir Francis endeavored to explain to Passepartout that as they were progressing steadily toward the east the days were shorter, and each degree that was passed made a difference of four minutes, so that when a new meridian had been reached it was necessary to regulate his watch, as the Greenwich time was based upon the meridian of Greenwich. But all this advice was lost on the worthy Passepartout, who

continued to keep his old turnip of a watch true to Greenwich time.

Early on the morning of October 22, they arrived at the end of the railway, and found that they were still fifty miles from Allahabad, although the completion of the railway to that town had been announced. Phileas Fogg was determined not a moment should be lost in continuing his journey, and the only means that seemed possible was to hire an elephant.

Even this was not easy, as the only Indian at Kholby, the village at which they had arrived, who had an elephant had no wish to part with it. Not even an offer of a thousand pounds moved him, and only when Mr. Fogg offered the enormous sum of $10,000 would the Indian sell the animal. Passepartout was aghast at such a price being paid for an elephant, and Sir Francis Cromarty no less. But without delay the animal was got ready for the journey, and a young Parsee offered himself, and was engaged as driver.

They had arrived at eight, and at nine o'clock they set out on the back of the elephant, taking the road which led through a beautiful forest of palms. By eight o'clock at night they had gone half-way to Allahabad. Setting off again at six o'clock next morning, the guide hoped to arrive in Allahabad that evening, and would no doubt have been as good as his word, but about four o'clock, as they were threading their way through a thick forest, they happened to espy a strange religious procession, conveying a dead rajah to a forest-temple. There were many priests in the procession, which was accompanied by weird music, and a young woman, almost as white as a European, was being dragged by them, clearly against her will.

"A suttee!" whispered Sir Francis to Mr. Fogg, who did not seem to understand what he meant. "A suttee," he continued, "is a human sacrifice; but the victim is supposed to be voluntary. This young woman, no doubt the widow of the dead rajah, will be burned alive early to-morrow morning."

"At sunrise," said the guide; "but hers is not a voluntary sacrifice, as everybody round about here is aware."

Phileas Fogg was greatly impressed with what they had seen, and seemed troubled in thought after the procession had disappeared and the guide had resumed the journey. "I am still twelve hours to the good, and I would willingly give these hours to save the young woman," he said quietly. The guide was able to give more information

PASSEPARTOUT WAS DRIVEN FROM THE TEMPLE WITHOUT HIS BOOTS

PASSEPARTOUT RESCUES THE RAJAH'S WIDOW FROM BEING BURNED ALIVE

about the intended victim, who was the daughter of a rich Bombay merchant, and had received an education which would have made it difficult to tell her from a European. Her name was Aouda. She had been married only three months to the rajah, and, knowing well what would be her fate if he died, she had endeavored to escape, but had been recaptured. All this made Mr. Fogg the more determined to save her if he could, and he directed the guide to take them towards the temple, so that when the night fell they might carry out some means of escape for the poor woman.

When they came within sight of the temple the ceremonies were still going on, and when the procession went away guards with flaming torches remained, to keep watch over the victim. How to affect a rescue was indeed a puzzle, and Mr. Fogg and his friends had waited until midnight without being able to decide upon a plan of action. Passepartout, however, determined to try a little plan of his own, and slipped away without a word to his companions.

The hours of darkness slowly dragged out, and it was clearly impossible to force an entry into the temple. Then the thinning shadows announced the approach of dawn. The hour of sacrifice was at hand. Presently the temple doors were opened, and the victim was brought forth by two priests, while a great crowd of fakirs and other mourners had now assembled, and made loud noises as they followed Aouda and the priests. Fogg and his companions mixed with the tail-end of the crowd, and in a few minutes they had arrived by the river-side, where, on a funeral pyre, lay the body of the rajah.

In the semi-light of the early dawn they could see the almost lifeless body of the youthful victim lying beside the body of her dead husband. Then a torch was applied to the pile, and the wood, steeped with oil, began to burn. Suddenly a cry of terror arose, and all the crowd of people threw themselves to earth, horror-stricken. It seemed as though the rajah was not dead, but had suddenly come to life again. Raising the young woman in his arms he descended from the funeral pyre amid the wreathing smoke, which gave to him a strange spectral appearance.

The priests and the people, amazed at such a prodigy, dared not raise their eyes from the ground, and the figure of the rajah, firmly grasping the un-

resisting form of the young woman, marched clear through the crowd to where Mr. Fogg and Sir Francis Cromarty stood. "Let's get on," it said. For it was Passepartout himself, who had profited by the smoke of the funeral pyre to steal into the thick of it and rescue the intended victim from the flames which were now bursting forth!

THE ESCAPE INTO THE FOREST AFTER THE RESCUE OF AOUDA

An instant afterwards and all four had disappeared into the forest, being carried forward at a steady trot by the elephant. Not a moment was to be lost, as they had gone but a little way when they heard cries which indicated that the ruse had been discovered, and a gun-shot pierced the hat of Phileas Fogg. But success attended them, for the guide knew all the secrets of the forest, and forced the elephant to the height of its pace so that by ten o'clock they were at Allahabad, where the railway journey was resumed to Calcutta.

Mr. Fogg, in paying the guide, gave him the exact sum agreed upon, which astonished Passepartout, as his master had shown himself so generous. But as Mr. Fogg had no further use for the elephant, he presented that to the faithful Parsee, who protested that it was a fortune he was offering him. "Accept it, and it is I who will be your debtor," was all that Mr. Fogg would say.

A few minutes afterwards he and his companions, together with Aouda, who was given the best place, were snugly installed in the railway carriage, proceeding at all speed to Benares, where Sir Francis took leave of Mr. Fogg and wished him all success. By seven o'clock in the morning Calcutta had been reached, and as the mail-boat for Hong Kong would not weigh anchor till noon, Mr. Fogg had still five hours before him.

THE ARREST AT CALCUTTA, AND HOW THE TRAVELERS GOT AWAY

But just as Mr. Fogg was about to quit the station, he was met by a policeman, who asked him if he was Mr. Phileas Fogg, and the man with him his servant. "Yes," said Mr. Fogg. The policeman then requested both of them to follow him, and said Aouda might accompany them.

They were conducted to a carriage, and in twenty minutes, during which none of them spoke, they were driven to a court-house of the district, and were soon brought before a magistrate.

Very soon the reason for this unexpected interruption was apparent, when Passepartout stood charged with behaving in a disorderly manner in the temple at Bombay. His master was also involved in the charge, and the detective Fix was congratulating himself on his ingenuity in having reported the matter to Calcutta and secured the arrest of Fogg and Passepartout, as he hoped thus to detain them until the arrival of the order of arrest from England. But that ingenious officer had not been prepared for Mr. Fogg undertaking to pay any possible sum that might be named as bail, certainly not $5,000 each!

This Mr. Fogg did cheerfully, to the wonder of not a few; and Passepartout's boots, brought from Bombay as the strongest evidence against him, were returned to their owner, who considered they had become the most expensive pair of boots in all the world.

OFF TO HONG KONG, WITH FIX, THE DETECTIVE, IN PURSUIT

Mr. Fogg and his companions left the court-house and drove straight for the quay, followed closely by the detective. There in the harbor lay the steamship Rangoon, with steam up and the Blue Peter floating from the masthead. Mr. Fogg hailed a small boat, and was rowed towards the steamship in the company of Aouda and Passepartout. This was too much for the detective, who stamped his feet in anger.

"The rascal!" he exclaimed. "He is going off at a sacrifice of $10,000! Only a robber could be so free with his money. Ah, but I'll follow him to the ends of the world, if necessary! Only, if he goes on like this, all the stolen money will be spent by then!"

Fix had therefore to join the Rangoon without waiting until the order of arrest had arrived, and he had to be very careful not to excite suspicion in the minds of those whom he was tracking, so that he pretended it was an extraordinary coincidence to meet them again. In the course of the journey he managed to draw from Passepartout the story of Aouda and how she came to be one of their traveling companions. This was, the detective thought, important news to him, as he hoped he might use it to

get the restless travelers stopped at Hong Kong, in which port Mr. Fogg meant to restore Aouda to one of her relatives, a rich merchant of that town.

WHAT HAPPENED AT HONG KONG, AND HOW MR. FOGG MISSED THE MAIL-BOAT

The latter part of the voyage to Hong Kong was marked by rough weather, and the Rangoon arrived there a day late, making the port on November 6 instead of November 5. It was Mr. Fogg's intention to take passage immediately in the steamship, the Carnatic, which was due to sail on the fifth, but, having to effect some repairs to its boilers, had been delayed until the seventh. Thus, by good luck, as it seemed, Mr. Fogg had no less than sixteen hours ashore, in which he could make inquiries about Aouda's relatives. The result of these inquiries was the discovery that the rich merchant had left Hong Kong and settled in Europe, so that, clearly, Aouda would have to continue in the company of her rescuers for a long way yet.

Passepartout was despatched to engage three cabins in the Carnatic, and on the way fell in with the detective, who felt that the time had come for desperate methods when he heard that Mr. Fogg was to sail with the Carnatic early next morning. In the meantime, however, repairs having been made to the steamship's boilers, it had been decided that she would sail that night instead of next morning. This made the situation still more desperate.

PASSEPARTOUT'S VISIT TO AN OPIUM DEN AND THE CONSEQUENCES

Fix contrived to entice Passepartout into an opium den. He first tested the Frenchman's loyalty to his master by assuring him that the story of the wager was only Fogg's pretext for getting away with the stolen money, and he offered to share his reward with Passepartout if he would help him to get his master arrested. But the servant indignantly refused. He had not acted wisely in everything, but he was at least loyal to his master. Unhappily, he allowed the detective to entice him into smoking a pipe of opium, and that was why the Carnatic sailed that night without certain passengers for whom cabins had been booked. Mr. Fogg was deeply annoyed, on arriving at the quay in the morning, to discover that the vessel had gone; and there he met the detective, whose heart bounded with delight as he informed Mr. Fogg that the next boat sailed in eight days. With Fogg delayed eight days at Hong Kong, there would be time to receive the order of arrest which was now on its way! But Phileas Fogg was not content to accept the situation as it stood, and he went from pilot to pilot, making inquiries as to the possibility of hiring some vessel which would land him at Yokohama by the fourteenth, in time to catch the mail steamer for San Francisco.

At first it seemed a hopeless quest. Many laughed at him for his pains; but at length he discovered that the mail steamer really started from Shanghai, calling later at Yokohama. Shanghai is 800 miles from Hong Kong, and they had four days to cover the distance. This the master of the brigantine Tankadere, John Bunsby, believed he could accomplish if the sea held calm.

MR. FOGG'S DESPERATE VOYAGE, AND HOW HE CAUGHT THE STEAMER

Mr. Fogg, promising him $500 per day and a prize of $1,000 extra if he got there in time, engaged the Tankadere, on which, within an hour, he set sail with Aouda, Passepartout having mysteriously disappeared. He also invited Fix to go with him, as that person said he, too, was anxious to get to Yokohama.

The voyage of the vessel was a most adventurous one, as the heaviest of seas were encountered, and the hope of catching the mail steamer before it sailed had fallen to vanishing-point. But throughout all the trials and disappointments of the hazardous journey, Mr. Fogg remained as calm as on his walks to the Reform Club, and none would have imagined that his fortune was at stake. They were no more than three miles from Shanghai when they made out a long feather of smoke in the distance, which betokened the departure of the American steamer, and Bunsby saw it with despair. But Mr. Fogg merely ordered him to fire a signal of distress and show the flag at half-mast, in the hope that the liner might change her course and make for them.

Meanwhile, when the Carnatic sailed on the evening of the seventh from Hong Kong, although two of the three passengers who had hoped to join it

were left behind, it carried the third with it. Poor Passepartout, overcome by the opium and left by the detective, kept repeating "The Carnatic, the Carnatic!" as the effect of the drug began to pass away.

HOW PASSEPARTOUT BECAME A CIRCUS PERFORMER IN JAPAN

And this fixed idea had enabled him, while still half fuddled, to make his way from the opium den and tumble on board just as the vessel was about to sail. But we can imagine his dismay when he came to his senses next day, and discovered how foolishly he had acted. On November 13 he found himself at Yokohama, and, having no money left, he was reduced to join a troupe of ridiculous circus performers known as the "Long Noses," because they all wore enormous noses, several feet in length, when going through their acrobatic antics. As the troupe was about to go to America, Passepartout thought that this was a good plan for getting his passage thither, now he had lost his master. His brawny form made him just the man for the base of the "human pyramid," which was the great attraction of the performance of the "Long Noses." He was fulfilling that responsible position one day when he suddenly seemed to forget his work, and let the other members of the "human pyramid" tumble to the ground, while he ran forward and threw himself at the feet of one of the spectators, crying: "My master, my master!"

"You?" said Phileas Fogg. "Very well, then, let's get off to the steamer."

But Mr. Fogg had to part with a good handful of banknotes to the manager of the circus before that person let the latest of his "Long Noses" depart. And Passepartout, in the excitement of finding his master again, went all the way to the boat without taking off the ridiculous nose that he was wearing.

MR. FOGG ARRIVES AT YOKOHAMA AND FINDS HIS SERVANT

Thus we see that Mr. Fogg's signal of distress had been successful, as he, with Aouda and Fix, had been taken on board the American steamer, General Grant, after paying the master of the Tankadere the full sum agreed upon, and the prize as well. He had arrived at Yokohama, there to discover that Passepartout had actually been carried by the Carnatic to that port, and an hour or two later he found his servant in the circumstances just described.

On the American steamer they set out for San Francisco, and nine days after they had left Yokohama, Phileas Fogg had covered exactly one-half of the journey around the world. In other words, on November 23, the steamer had passed the hundred and eightieth meridian. Now, where was the detective? He was actually on board the General Grant, keeping in his cabin to avoid meeting Passepartout as long as possible.

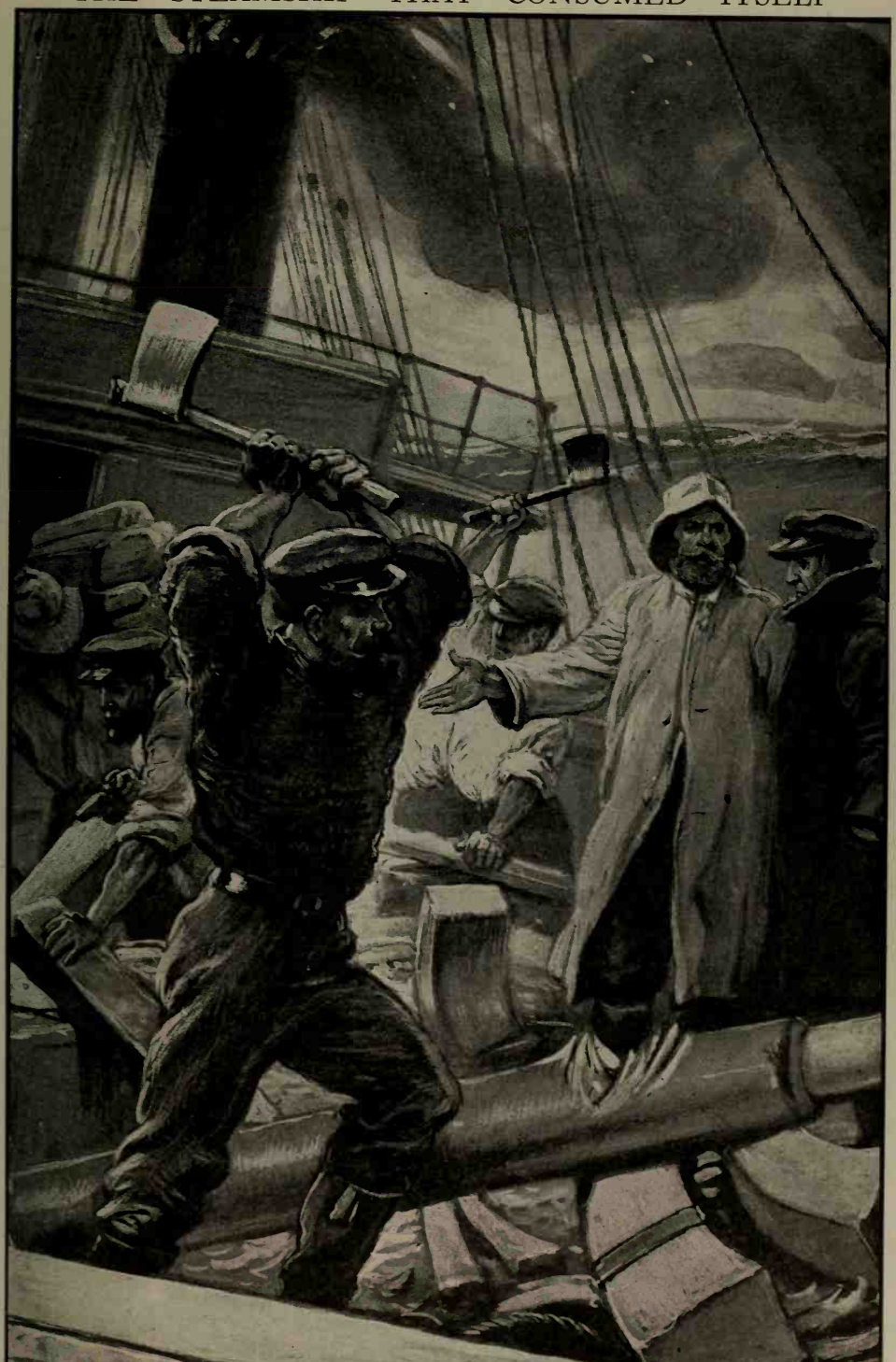
FIX, THE DETECTIVE, RECEIVES THE ORDER OF ARREST TOO LATE

At Yokohama he had discovered that the British consul had just received the order of arrest which Fix had missed at every other stopping-place on Mr. Fogg's journey; but as Mr. Fogg had now left British territory it was useless! The detective's desire was now to hasten Mr. Fogg's journey back to England, so that he could arrest him the moment he arrived there; he had no longer any wish to delay him, as both their interests were the same so far as the return to England was concerned. When Fix did encounter Passepartout on deck, the latter gave him a good thrashing, which the detective took as if he deserved it, and then explained why he no longer wished to delay Mr. Fogg.

On December 3 the steamer passed through the Golden Gate, and arrived at San Francisco. While walking in the town that day, Mr. Fogg, "by the most remarkable chance," met the detective, who had kept out of his sight during the voyage. "Business" had recalled him to Europe, so he explained how delighted he would be to travel thither in the company of Mr. Fogg. Meanwhile, Passepartout had been buying some revolvers, as the railway journey across America in those days was not without danger; and at six o'clock that night the train steamed out of San Francisco with Mr. Fogg and his companions as passengers.

In three days and three nights they had covered a matter of 382 miles. Four more days and four more nights should have taken them to New York; but the trouble, for which Passepartout had prepared, came, as the train was attacked by a band of Sioux Indians, who endeavored to stop it, after disabling

THE STEAMSHIP THAT CONSUMED ITSELF



When nearly eight hundred miles from the coast of England the coal supply gave out, so Mr. Fogg bought the steamer for $60,000, and ordered the crew to cut down the masts and woodwork to feed the furnaces.

the engineer, but, of course, did not know which of the levers ought to be worked.

PASSEPARTOUT SAVES HIS FRIENDS FROM INDIANS, AND IS CAPTURED HIMSELF

Thanks to Passepartout, the passengers were saved. He managed to crawl along the bottom of a coach and disconnect the engine from the train, so that while the engine went on alone, the coaches slowed down at Fort Kearney station, where the Indians made off, being afraid to meet the soldiers who were stationed there.

It was found, however, that Passepartout and two others had been taken prisoners by the Indians; and, of course, Mr. Fogg would not continue his journey until the fate of Passepartout was assured. A company of soldiers were therefore sent in pursuit of the Indians, and next day they returned with Passepartout and the other two, whom they had recovered alive from the Sioux. But, meanwhile, the train had been made up again, and had continued on its way to New York. The next train would not leave until that evening. This meant a very serious delay, as Mr. Fogg had to catch the steamer for Liverpool at New York at nine o'clock on the evening of the eleventh. As the ground was covered with snow, and a strong wind was rising, there remained the possibility of their making good speed in an ice-boat!

A SURPRISING JOURNEY OVERLAND IN AN AMERICAN ICE-BOAT

So, in a large sledge furnished with strong sails, the party set out to cover the 200 miles between Kearney and Omaha, where the railway to Chicago could be joined. The run of the ice-boat was an entire success, and at Chicago there was no lack of trains for New York. But, alas, Mr. Fogg was three-quarters of an hour late in New York, and the Liverpool steamer had gone!

There was nothing for it but to hire a boat, and this was no easy matter. Not until he had offered the captain of a steamer $8,000 to take himself and his three companions to Bordeaux, where the steamer was bound, could he get away from New York. But, of course, he did not wish to go to Bordeaux, and when they had been at sea some days Mr. Fogg had to take the extreme measure of bribing every member of the crew. Then he imprisoned the captain and assumed command himself, for it now appeared that he was a practised navigator.

They had got to within 770 miles of Liverpool when the coal entirely gave out, and Mr. Fogg brought the captain to reason by the simple process of buying the vessel from him at $60,000, which was much above its value. He then gave orders to burn the masts, and so they went along, tearing up all the woodwork to feed the furnaces, until, when they arrived at Queenstown, the vessel was only a fragment of what it had been. But Mr. Fogg presented it to the captain, and left him on friendly terms.

MR. FOGG ARRESTED AT LAST, AND WHY HE THOUGHT HE HAD LOST HIS WAGER

Train to Dublin and steamer to Liverpool left him only six hours to do the journey from the Mersey port to London. It would have been sufficient; but, as he stepped on the quay at Liverpool, Fix, the detective, laid his hand on his shoulder, and, showing the order of arrest, said:

"I arrest you in the Queen's name!"

So off to prison was Mr. Fogg hurried, and he had been two hours there before Passepartout and Aouda arrived in company of Fix, the latter out of breath and his hair wildly disordered, to announce that it was all a mistake, as the real bank-robber had been arrested. Mr. Fogg said not a word, but, with automatic precision lifted his hand and struck the stupid detective to the ground. He walked away with Aouda and Passepartout, hired a carriage to the station, commanded a special train to London, and arrived there as the fingers of the station clock showed ten minutes to nine. He was five minutes late, and had lost his wager!

Not only had poor Phileas Fogg lost his wager, but he had wasted his fortune, and Aouda sought to console him in his dejected frame of mind. She had really, come to love the strange, quiet man who, on every occasion on which he was tested, had shown the kindest of hearts. And he himself was in love with her, though he would never have avowed it. It was therefore left to Aouda to propose that if he were now to be a poor man he required somecne

to comfort him, and as he had been the means of saving her life, and had perhaps for that reason lost his wager, she should be his comforter. Mr. Fogg felt that this would be a most desirable arrangement, and would compensate him for his disappointment. So next day Passepartout was despatched to interview the parish clergyman of Marylebone and make arrangements for the marriage. When he returned he was breathless with excitement, for the clergyman had said it was impossible to arrange anything, to-morrow being Sunday.

"To-day Saturday! Impossible!" exclaimed Mr. Fogg. "To-day is Sunday, and to-morrow Monday!"

precisely. He had won his wager of £20,000, and his friends were there waiting for him, as they had arranged eighty days before.

And how was it possible for so exact a man as Phileas Fogg to make a mistake of twenty-four hours in his calculations? Simply because he had not allowed for the time gained on a journey made continually in an easterly direction, though Sir Francis Cromarty had pointed this out to Passepartout. In going round the world towards the east a day is gained, and in going round towards the west a day is lost. Phileas Fogg, traveling always eastwards, should have retarded his watch four minutes for every degree he passed; and as

PASSEPARTOUT SEIZED HIS MASTER BY THE COLLAR AND HURRIED HIM TO A CAB

"But no," persisted Passepartout; "you have made a mistake of a whole day! We have arrived twenty-four hours in advance of our time, but you have only ten minutes now to spare to get to the club."

Saying this, the excited servant had caught his master by the collar of his coat and was dragging him towards the door, so that Phileas Fogg was out of his house and into a cab before he knew where he was. The driver, being promised a fabulous sum if he would reach the destination in time, made for the Reform Club, and arrived there after running over two dogs and colliding with five carriages. But Phileas Fogg was able to enter the reading-room at the club at a quarter to nine

there are 360 degrees on the circumference of the earth, these multiplied by four give precisely twenty-four hours—the day he had unconsciously gained. In other words, while Mr. Fogg was traveling eastward, he saw the sun at its meridian, which means directly overhead eighty times, while his friends who remained in London had seen it only seventy-nine times. And that is how the famous watch of Passepartout, which had always preserved the London time, had lost a day.

There is nothing more to tell except that the charming Aouda, in due course, made Mr. Fogg the happiest of men. And one might make a voyage round the world for something less than that!

THE NEXT FAMOUS BOOKS ARE ON PAGE 5049.

FERNS AND FEATHERS OF THE SEA

We only realize the beauty and delicacy of the various seaweeds that are found in the waters round our coasts when we collect them and, after pressing the specimens, arrange them on sheets of paper, as shown here. All the "ferns and feathers of the sea" on this page are common specimens found round our coasts.

A COLLECTION OF SEAWEEDS

CONTINUED FROM 4830

THERE are few natural objects that provide so artistic and graceful a collection as seaweeds; and as these are to be found in abundance and variety on all our coasts, it is within every boy's and girl's power to make a collection, for we all go sometimes to the seaside. Butterflies and moths may present more color, and flowers may be more familiar to the eye, but for really artistic effect a collection of seaweeds is second to neither of these.

Some of the seaweeds found in water have stems of enormous length. One which grows in the Pacific Ocean has a stem over three hundred feet long, and another sometimes reaches the enormous length of fifteen hundred feet. But the seaweeds usually found around our coasts are mostly small, and very suitable for mounting on cards.

Of course, seaweeds have their commercial uses. On the coasts of Europe seaweed is gathered and used to make manure for the land. This was formerly much more used than it is now. Other kinds are used as food for cattle, and one or two varieties are even eaten for human food. Then, again, seaweeds contain much iodine, which is sometimes extracted for medical uses. But it is not for these purposes that we shall collect seaweeds, but rather to provide an interesting hobby, and to give us a really attractive little marine museum that can be packed in a small space.

For the collecting of seaweeds a very inexpensive equipment is needed. We should have a stick with a hooked handle, which is useful for drawing ashore any weeds that may be floating a little distance out from the shore, a good knife with a strong blade for cutting pieces of the stouter weeds from the main plant, and a waterproof bag or a fishing-basket in which we can carry home our specimens.

The seaweeds are to be found at high-water mark, where many specimens that have been torn off by the waves are left stranded, and they are also found at low-water mark. It is the coarser and bigger weeds that are found detached in this way, but in the rock-pools many of the finer and more delicate seaweeds grow in abundance, and these, although they do not look very attractive, perhaps, in the water, are beautiful when dried and mounted.

As beginners in the art of collecting seaweeds, we shall get all the specimens we need on the beach and among the rocks. The weeds very often have sand and other matter sticking to them, and this may be roughly rinsed off in the pools among the rocks.

When we get our specimens home, we should take a large basin, full of sea-water, and empty them into this. It is essential that we should use sea-water, as some of the seaweeds begin to decompose if placed in fresh water. If a large basin is not available a small bath can be used, but the basin is most suitable because we are able to see the specimens that are in it quite clearly.

After washing the seaweeds by shaking them about in the water, we should place them in another vessel containing seawater that has been filtered through a piece of muslin or toweling. Here, again, a white dish is the best kind of receptacle that can be used, and it should be rather larger than the sheets of paper upon which we intend to mount our specimens. Cartridge or any similar thick paper is suitable, and we may use two or three sizes for the different specimens. Five inches by three and a half inches, eight inches by six inches, and twelve inches by eight inches are all suitable sizes. It is well to have a sheet of perforated zinc, as this greatly helps in the mounting of the specimens. We place a sheet of paper upon the zinc,

which may have one of its edges turned up to prevent the paper slipping off, and then we pass these into the dish, beneath the floating specimen that we wish to mount. While the seaweed is still in the water, we remove any lingering impurities, such as grains of sand, with a camel-hair brush, and then raising our zinc and paper so that the specimen rests upon the paper, though it is still in the water, we arrange it neatly and artistically by means of the brush. If there are any ugly pieces or ends that spoil the general outline of the specimen, these may be snipped off under water with scissors.

So soon as the specimen is nicely arranged on the paper, we raise the zinc gently out of the water, taking care not to disarrange the seaweeds. The water runs off the paper and through the holes in the zinc. Now slide the sheet of mounting-paper, on which the specimen is resting, off the zinc on to a sheet of muslin or calico that has previously been laid on some sheets of thick blotting-paper.

MOUNTING THE SEAWEEDS

With a perfectly clean sponge of fine texture mop up the water that is lying on the paper, taking care, however, not to touch or disarrange the specimen in any way. Then lay over the paper and specimen another clean smooth piece of muslin or calico, and on top of this several sheets of blotting-paper. The whole must then be put into a press, but the pressure must not be very great. If a press is not available, use large, heavy books, laying them on evenly and carefully. After two or three hours the blotting-paper should be removed, and fresh paper put in its place, but the muslin or calico must not be removed. At intervals of twelve or fifteen hours this process should be repeated, and at the end of four days the calico may be removed, and the seaweed itself transferred to dry paper, and, if necessary, pressed as before.

In most cases it will be found that the specimen will adhere to the mounting-paper under pressure without any adhesive material being necessary. Should it be necessary, however, to stick the seaweed down, the following is an excellent method: Boil some milk, and skim off the skin that rises to the top. Then placing the specimen upon a piece of smooth calico, with a sponge or soft rag moisten the paper with the milk, and lay the sheet carefully upon the weed, which will adhere to the paper. The sheet should then be put under pressure as before.

HOW TO MOUNT THICK SEAWEEDS

The thicker kinds of seaweeds, like bladder-wrack and its relations, should be washed in fresh water to remove the salt, and may then be dried between towels and pressed in the manner stated above. To affix these to the mounting-sheets, a little gum may be used. With these coarser weeds, if it is not convenient to mount them at once, we may allow them to dry in the air, and then, whenever we are ready to mount, we should soak them in boiling water for about twenty minutes. This removes the salt and other impurities, and afterwards they may be washed in fresh water, and pressed as described. The sticky kinds of seaweeds, after being arranged on paper, should be allowed to dry in the air before being pressed, or they will adhere to the calico and be spoiled.

All specimens should have written below them the time and place where they were gathered, and their name and family, if possible. It will take time to identify all our specimens, but this may be done by consulting a book upon seaweeds with colored plates, such as is to be found in most public libraries.

CATALOGUING THE SEAWEEDS

Like land plants, the great family to which the seaweeds belong are arranged in groups, and many of the species can be distinguished from one another only by close examination. This work of identifying what we have collected and mounted is, however, interesting, and, of course, a named collection is infinitely more valuable and creditable than a mere collection of odds and ends, the names of which are unknown. It is impossible here to give any account of the various species of seaweeds, but we shall find it helpful to know that there are three main groups—the green, the red, and the olive-colored.

The first group consists principally of thread-like or net-like weeds, and most of its varieties are found not in the sea, but in fresh water.

The weeds belonging to the second group are exclusively marine. They are, as the name implies, nearly always red in color, and are very light and delicate, and frequently almost transparent. Some are like moss in appearance, others resemble ferns, and others look something like coral. They are the most attractive of all the seaweeds from the collector's point of view, and many of those in the picture on page 4920 belong to this group.

The third group is also exclusively marine. The weeds belonging to it are generally large and coarse, and in foreign waters are almost like small floating trees. The very common bladder-wrack of our coasts, that coarse, brown weed with fronds and air-vessels that is found everywhere, and dries black, grows sometimes to a height of ten or eleven feet, and the clusters are often twelve feet or more in circumference. Some weeds of this group are small and beautiful, while others are flat.

There is a pretty scarlet seedweed which is found usually in June and July; its shape resembles that of the hart's tongue fern, and it still retains its color after it has been dried. Another familiar variety is that known as sea-lettuce, which is a very delicate shade of green. The common coralline has a purple tinge when growing, but turns white when dried.

HOW TO KEEP THE SPECIMENS

When we have collected a large number of seaweeds we may arrange our specimens on sheets of paper as described above, so that they will present somewhat the appearance shown on page 4920, the next question that arises is where and how shall we keep these sheets.

Instead of a portfolio we can use a box, especially if we are collecting several specimens of each kind of seaweed.

Whatever may be the plan followed, the great thing is to observe neatness and order in the arrangement of the specimens.

PRINTING AND FANCY LETTERING

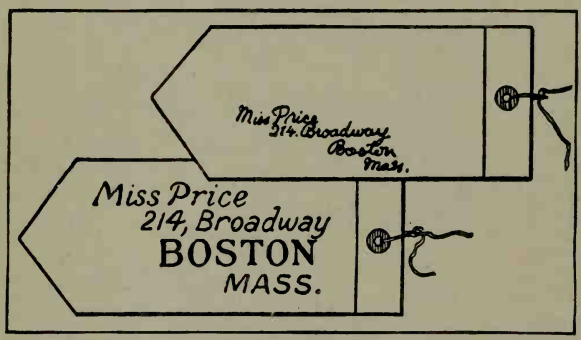
THE art of lettering, by which we mean the ability to make ornamental letters as apart from those of ordinary handwriting, is a very useful one. People sometimes call them "printed" letters, because they are like those used in books—and usually found on the heading and on title-pages. We must have photographs, plants—for all these "lettering" is more suitable than ordinary handwriting. If we want to put the name on a boat, or gate, or over the top of a toy theatre, to write in a hat or cap, inside our school books, on a drawing-board or T-square; if we want to make good headings for our lessons or examination

abcdefghijklmnopqrstuvwxyz

1. An excellent type of small lettering, which may be printed with a pen or brush without difficulty.

often noticed these letters, and perhaps even thought how well they were arranged; but it may not have occurred to us that they all have to be made by a pen in someone's hand before the printing machine can produce them so neatly.

Our artists are constantly designing new and ornamental shapes and ways of making the alphabet, and when we know something about this very interesting art, we shall look with new interest at the title-pages of good books, and observe on many other things — such as statuary, monuments, buildings, tablets, and so on —how very beautiful the letters used in our language can be drawn.



2. A label written in the ordinary way and a label printed.

Let us think of a few of the things which seem to call for "printed" letters rather than "written" ones.

To begin with, quite ordinary household things like addresses on parcels and baggage are much clearer if done in neat, plain capitals, and so are more likely to be correctly read by busy porters and postmen, and are less likely to get lost. See picture 2.

Then there are lists of things such as those we pin up inside the doors of the book-case or music-cabinet or store-room; albums containing collections of things such as stamps, papers, or put clear names on our maps—we shall find lettering most useful.

Then there are clothes to be marked with marking-ink, chests of small drawers needing labels of contents, handkerchief initials, Xmas cards, the outer covers of music and books, embroidery, wood-carving, and many other things where letters play an important part.

Here are a few simple rules in easy lettering, and two alphabets—as we see in pictures 1 and 3—which we must learn by copying them out several times as carefully as possible. With these two styles we shall find ourselves able to letter anything quite suitably, and for ordinary purposes these are sufficient to know.

1. Do not mix up different kinds of letters in one word.

2. Remember that the rule "thin up-strokes and thick down-strokes" must be applied to printed capitals as well as to copybook handwriting. Look at picture 3.

3. Beware of cutting up a word into meaningless syllables.

4. Make bold letters, and give full prominence to each part.

5. Do not crowd the letters together, and make them quite straight on a line.

3. The capital letters shown here are easily made, and, as can be seen, they may be arranged in squares.

6. A useful point to remember when beginning is that each capital can be fitted into a square, except, of course, the letters I and J, which fill one square between them.

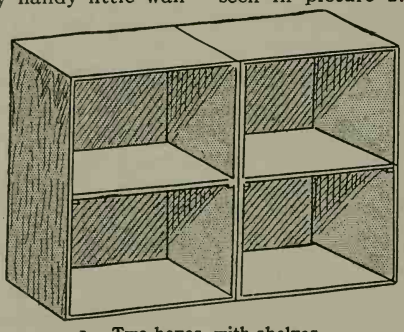
The letters in picture 3 have been done with a brush dipped in ink, which, by the way, is a better thing to use than a steel nib when brown paper or any other rough substance has to be written upon. Or a quill pen will make excellent letters.

Let us look at the pictures of the two baggage labels on page 4923. Which is the clearer and more easily read? The bottom one, of course, and yet it took but very little longer to do than the other. We must always remember to give prominence to the most important word by writing it in the largest letters, or using another set of letters, as we see has been done on the second label. This rule applies to everything—not only to addresses.

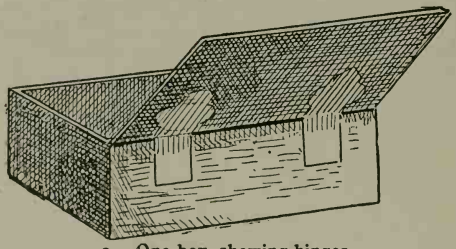
At first we shall need a pencil-line as a guide to keep the letters straight, but when we have become more accustomed to the work, we shall be able to do without this, just as we do without it in ordinary writing.

A CABINET MADE FROM CIGAR-BOXES

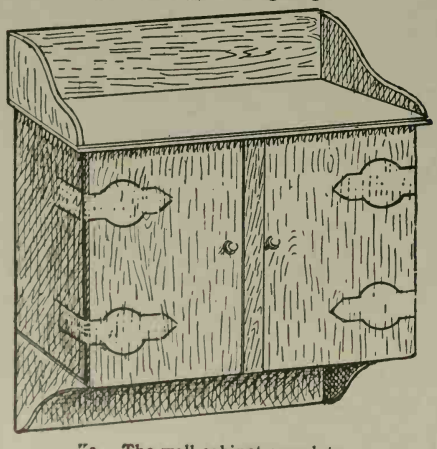
WITH three cigar-boxes, and close attention to the instructions given in this article, we can make a very handy little wall cabinet that will serve many useful purposes. Two of the cigar-boxes should be of similar size, but the third need not be quite the same size, as it is going to be pulled to pieces and the wood of it used. First we must take off all the paper on the boxes. This can very easily be done by using a wet sponge and letting the boxes stand for several minutes before removing the paper. When we have removed all the paper, we must be sure to allow the boxes to dry gradually, and not seek to hasten the process by putting them in front of the fire, which would probably crack the wood. The third box we take apart, in doing so endeavoring to be as careful as possible not to break the pieces, and keeping the nails, which we shall want to use presently.



1. Two boxes, with shelves.



2. One box, showing hinges.



3. The wall cabinet complete.

Most cigar-boxes have a brand-mark which is burned in on the outside of the lid, so in order to get rid of this we turn the lids, making the inside what was formerly the outside.

After we have cut two strips of wood from the cigar-box that we have taken to pieces, and have made them the proper size, we then fit them into the cigar-boxes, as is shown in picture 1, to do duty as shelves. Two nails from each side through the two sides of the boxes will keep them in position. Now we take two pieces of linen or cotton, cut them to some ornamental shape, and glue them to the lid and to the back of the box, so as to make hinges, as seen in picture 2. Then we glue the front sides of the two boxes face to face, and this will give us a two-compartment cabinet, with a shelf in the middle of each compartment, as seen in picture 1. With two more pieces of the broken box we make two slips—one to be placed right along the top of our cabinet outside and the other to go right along the bottom. Picture 3 shows that the piece on top and the piece on the bottom are similar in pattern. Both these pieces should be glued on, and a few nails will help them also, but we must take care not to split the wood. Now by putting on a long piece top and bottom, supported by two brackets, which we cut from the third box, we can give our cigar-box cabinet both strength and ornamentation. All we have still to do is to cut a narrow strip of wood about half an inch wide and the length of the doors.

After rounding this on two of its corners, we glue it to the edge of one of the doors, so that it will come over the edge of the other door, as seen in picture 3. Two tiny brass knobs, one for each lid near its edge, will complete the cabinet, which we may hang in our bedrooms, and which we shall find convenient for museum specimens, for tiny bottles, for seeds, and for many other things which boys and girls may wish to treasure and which ought to be kept in proper order.

CAN YOU MAKE THESE INTO PICTURES?

It is difficult to recognize these objects if we look at them in the ordinary way, but any boy or girl can make them into pictures by looking at them properly. By holding the page horizontally some distance away, on a level with our eyes, so that we look along the page, we shall see some fruit, a kitten playing with a ball, a bird, and a house. The reason for this is that the pictures are drawn with the perspective wrong.

HOW TO CHOOSE CHRISTMAS PRESENTS

THE art of choosing Christmas presents, or indeed any presents, lies not only in studying the tastes of the persons for whom they are intended, but in finding out precisely what is needed in each case—sometimes a very difficult task.

When Christmas is near at hand, a few suggestions may, perhaps, not be unwelcome. To begin with, of course, we must remember that pocket-money is by no means elastic; it has, on the contrary, an unpleasant habit of shrinking very quickly long before we have half finished our purchases, so that, though we naturally scorn things of the "cheap and common" type, they must be as inexpensive and as original as possible.

At the top of our list comes mother. It is just possible that she might be in want of a new thimble; if so, the silver ones lined with steel are by far the best, for they wear excellently. A good one costs about 90 cents, but if that is too dear she might like a leather spectacle-case, costing about 25 cents, or better still, you might give her a useful purse which costs between 25 cents and a dollar; or a little bottle of scent—one can, of course, pay anything from 10 cents to $2 for this—or a cosy pair of bedroom slippers, which can be bought for $1 or thereabouts.

SOME INEXPENSIVE PRESENTS

And if all these things are too expensive, why not buy a dainty calendar to hang up on the wall? Or we might make a little pin cushion of flowered cretonne stuffed with bran. We could, no doubt, find some odd pieces from chair-cover cuttings. The cushion, which should measure about seven inches square, should be covered with white book-muslin with a pleated or gathered frill, all round the edge, finished off with a dainty bow of pink ribbon. We should choose a big rose-patterned cretonne, so that the color shows very distinctly through the cover.

A tiny "Dorothy bag," made of silk, or brocade, to hold a ball of crochet cotton, is useful and can be quite easily made. If we are not sure how to cut it out, we can look at page 2587.

If we begin early, nothing, of course, could be nicer than to work the ribbon-work table-square described on page 2139, or the handkerchief or glove sachets mentioned on page 1250, or else the brush and comb bag on page 248.

Flower-pots make pretty gifts. They are now to be had in soft shades of blue and green and pink, and quite artistic shades can be bought for 25 cents or 30 cents; or, of course, one can spend a little more and get something quite delightful in beaten copper-work or brass. A fern or aspidistra plant will fill an odd corner of the sitting-room; or a pair of glass flower-vases, for the table, at about 25 cents or 30 cents each, is certain of finding a welcome.

PRESENTS FOR A GIRL

Those of us who have grown-up sisters or aunts who must not be forgotten will find many of these things quite as suitable for them.

A grown-up sister would love a silver pocket-mirror, which we could buy for 50 cents or 75 cents, or a fancy hatpin, which would cost less. A silver hatpin-stand for the dressing-table can be bought for about 80 cents. A pair of gloves at $1 or a little embroidered handkerchief, for which we need not pay more than 15 cents or 20 cents, or a veil, are certainly not very original, but nothing is more sure of a welcome.

The hockey-scarf mentioned on page 1364 makes a useful present; so does the Dorothy bag already referred to, if it is made big enough to hold a pair of party shoes; or it might even be cut square for a work-bag for mother. An old lady might like one of these bags in silk, for a church bag, to carry her Prayer-book, hymn-book, handkerchief, spectacles, or any other small articles.

USEFUL AND ATTRACTIVE GIFTS

A big sister might like one of those little rolled-gold safety-pins which are so useful to fix a blouse-tie or a turn-over collar. These cost about 25 cents. Or a little "safety" purse, either in leather with a long silk cord attached, which costs about 50 cents, or better still, the kind described on page 4042, which we could, of course, make ourselves.

A bag for carrying opera-glasses is another useful present. These bags are made now in various colors with a little looking-glass underneath. The bottom of the bag is stiffened to hold the glass firm, and the top is drawn up by a cord. These cost about 50 cents or 75 cents, and are really very useful to anyone, for they hold a purse and handkerchief as well as the glasses.

A miniature edition of the poets makes a charming little present. All the bookshops keep quite a big selection at prices varying from 35 cents to $1.50.

Then, again, nothing can be more useful than a buckle in silver, or in that art metal-work which is now being used a great deal and is made in very attractive designs. These cost about $1.

Many girls would welcome a manicure buffer. We should choose the large wooden ones at 25 cents or 50 cents in preference to those made in silver, which are not nearly as serviceable.

A song or a piece of music makes a welcome present if a girl is musical, and costs only about 30 cents.

WHAT TO GIVE A MAN

Next on our list comes father. Men are not so easy to cater for, for after we have thought of pipe-stands, slippers, ash-trays, and tobacco-boxes, there seems to be very little left. A basket-work wastepaper-basket—quite a good one can be bought for 50 cents—or a 25-cent paper-knife might be appreciated.

If we can afford something a little more expensive, a little gold stud for $2, or a set of fancy vest-buttons, which might cost anything from 50 cents to $3, make nice presents.

A tie is often appreciated, but it should be chosen very carefully, not only as regards color, but style. If it is to be a girl's present

she should try to get a man to choose it for her. Men often do not like "made" ties; they much prefer the kind they can tie themselves.

If we can afford as much as $2, a fountain-pen of any of the well-known makes is an excellent present; if $2 is too much, a big brother or sister might be quite pleased with a "stylo." We can get this for 25 cents, or quite a nice one can be bought for 30 cents or 75 cents.

A subscription to a popular magazine is a gift that would be appreciated throughout the whole year. A telephone pad costing about twenty-five cents, or an umbrella, costing a dollar; a recent book of fiction, costing a dollar and a half are all presents that are sure to be acceptable. A clever boy or girl could make from an empty box, an artistic piece of furniture without much expense. He may choose to make a book-shelf, a flower-stand, or a small table.

If a man is interested in photography, he will like a snapshot album, or a roll of films which will cost from 15 cents to 30 cents, according to the size of the camera for which they are intended. If he motors, he might like a thermos bottle, a pocket flash-light, or a pair of driving gloves. There are nice little stamp cases which can be bought for 25 cents, and some leather purses which would no doubt be acceptable. A diary, with pockets, costs anything from 25 cents to 75 cents, or one can buy a neat-looking wallet for 50 cents or $1. A 25-cent penknife, a pipe, or even a packet of favorite tobacco might find favor.

A good idea for an acceptable present for a boy who is fond of painting is to get hold of his old paint-box and refill it with new paints. Here are the colors to ask for; they will cost from 35 cents to 60 cents each from any shop:

Gamboge	Cobalt Blue
Burnt Sienna	Vermilion
Brick Red	Chinese White
Hooker's Green	Yellow Ochre
Crimson Lake	Prussian Blue.

In this way we shall get quite good paints, far better than those supplied with the cheaper boxes one buys ready filled.

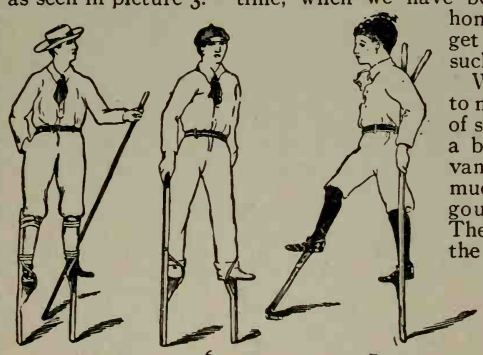
Without knowing the person for whom the present is intended, it is difficult to offer advice, as everything depends upon what he or she wants; but if we can only discover this, our present will be a certain success.

MAKING AND USING A PAIR OF STILTS

STILT-WALKING is good healthy exercise, and any boy can make his own stilts, so that the pastime can be followed without the expenditure of much money, or, indeed, of any money at all. It should be possible to get two pieces of wood six or seven feet long and about one and a half inches square. The wood should be as free from knots as possible, because knots rather weaken the wood. The pieces of wood should have a shoulder made in each, as seen in pictures 1 and 2, about two feet from the bottom end. Then from this shoulder the wood should be made to slope up for a few inches, as also seen in these pictures. Now we make two blocks, as seen in picture 3. These blocks should be three and a half inches wide and just as thick as the stilt-leg that we have already made. We should fix the blocks, as shown in pictures 3 and 4, into the shoulders. Now the next thing to do is to fasten the blocks to the stilt-legs. We can do this by putting nails, long screw-nails for preference, right through the legs into the blocks, taking care not to split either of them. An easier and perhaps better way is to put a piece of board cut to the proper shape on both the front and the back of each stilt, as seen in picture 4, and if this piece is made so that it is the exact height of the top of the block it will increase the size of the foothold, which is a good thing to do.

Making the step, or tread.

The top half of the stilts should be cut round instead of being left square, so as to give a good grip for the hands. This can be done with a pocket-knife or a spokeshave. We may, if we like, smooth the handle part by scraping it with a piece of broken glass, or by rubbing it with sand-paper. Now the stilts are ready for use, and a little practice will enable us to feel at home in them. The upper part goes behind the shoulders, as seen in picture 7, and below that the hands grip the round part, so as to steady the bearer. When we practise with the stilts we must begin by mounting them beside a wall or a fence, but after a time, when we have begun to feel more at home, we shall be able to get on to them without any such aid.



Three different kinds of stilts.

We have described how to make the simplest form of stilts. Picture 6 shows a boy using a more advanced pair. They are much shorter, and do not go up as far as the shoulders. The steadying is done by the hands, which are held not quite fully extended. Also the feet-blocks have straps to steady the feet. Picture 5 shows a yet more advanced type. Here all the work is done by the legs, and there are knee-straps as well as feet-straps, the hands not holding the stilts at all. It will be advisable to hold a long pole in one hand to help to steady the user.

WOUNDED ARTERIES AND VEINS

A SIXTH LESSON IN FIRST AID TO THE INJURED

WE already know the positions of the principal arteries of the body, and we also know the general way of treating bleeding. We are now going to learn how to go to work to stop bleeding in the different parts of the body. But we must have before us the diagram that we studied in an earlier lesson, showing the arteries of the body with the pressure-points, or spots upon which we press to stop bleeding.

First of all there are the arteries of the head and face. When the temporal artery, which can be felt pulsating in front of the upper part of the ear, is wounded, bleeding can be stopped by pressing against the bony prominence just in front of the ear.

Pressing a head artery.

If the occipital artery, which is the artery that carries the blood to the back part of the head, is wounded, we must stop the bleeding by pressing at a point immediately below the wound, as shown in the first picture. Bleeding from the facial artery is arrested by pressing at a point about an inch in front of the angle of the lower jaw. To do this we put the hand round the chin. Another method is to grip the cheek tightly between the thumb and forefinger, by placing the finger inside the mouth and pressing with the thumb outside.

An injury to the carotid arteries, which pass up each side of the windpipe, is very serious indeed, and pressure must be applied at once and continued by relays of helpers till the doctor arrives. We press the injured artery with all our might downward and backward against the spine, taking care to avoid pressing against the windpipe. It is of no use trying to put on a compress. Such an attempt is almost certain to result in the patient bleeding to death.

Stopping bleeding of the carotid artery.

The only method is to press the artery with the thumb, as is shown in the second picture, using all our strength. If one thumb gets tired, we can let someone else take a turn, or, if there is no other helper, we can use the other thumb while we rest the first one.

In the case of a wound of the forehead or scalp a small, firm pad should be applied on the place from which the blood flows, and this pad can be secured in position with a narrow bandage, the middle of the bandage being placed over the pad and the ends carried round and tied tightly above the pad. After the head and face we come to the upper limbs, and first of all there is the sub-clavian artery, which can be felt pulsating by the collar-bone, as we already know.

When this artery is injured, we should bare the patient's neck and upper chest, place his arm against the body, and press down the shoulder, making him lean his head toward the wounded side. Then grasping the neck, in the manner shown in the third picture, we press downward and backward over the centre of the collar-bone and against the first rib.

Pressing the sub-clavian artery.

The axillary artery, which is a continuation of the subclavian, can be felt throbbing in the armpit. The pressure, in case of injury, must be applied high up in the armpit against the upper part of the humerus, but it is difficult to apply pressure with the fingers or thumb when this artery is injured.

The best method of applying this pressure is to make a very hard pad, nearly the size of your wrist, place it in the armpit, and then tie it in position with a narrow bandage. We place the centre of the bandage against the pad, cross it on the shoulder, and then take the ends across the chest and back, and tie tightly under the opposite armpit, seeing, of course, that the pad remains exactly in its correct position and does not slip. The arm should be placed by the side with the forearm along in front of the body, and held in this position with a broad bandage, as may be seen in the fourth picture.

The brachial artery is a continuation of the axillary, and runs down the arm on the inner side. When this is wounded, the arm should be extended at right angles to the body, and we should grip the biceps muscle, pulling it aside and pressing down deeply with the tips of our fingers against the shaft of the humerus. Another way of stopping bleeding from the brachial artery is by the placing of a pad composed of a stone wrapped up in a folded handkerchief just inside the bend of the elbow, and doubling the forearm over the upper arm and tying it there with a bandage.

Below the elbow the brachial artery divides into the radial and ulnar arteries, and when either of these arteries are injured, firm pressure has to be speedily applied at the wrist. This may be done with the fingers, or we can use a cork which has been cut in two, placing one half on the radial artery and the other half on the ulnar, and tying them lightly in position with a narrow bandage.

Sometimes the palm of the hand is seriously injured. To stop the bleeding here it is necessary to make the patient lie down, raise the injured hand and arm, and after the palm has been carefully cleansed with cold water we make him grasp a firm pad, which is bandaged in position in the following manner. We spread out a triangular bandage, lay the back of the patient's hand in the centre, bring the point over the fingers and the wrist, pass the two ends of the bandage over the wrist, and cross back over the fingers. This crossing is done twice, and then we tie the ends tightly over the knuckles.

We next come to the arteries of the lower limbs. The femoral artery, which can be felt pulsating in the groin, runs from the thigh to the back of the knee, where it becomes the popliteal artery. In case of injury to the femoral artery pressure is applied at the groin. The first thing to do is to lay the patient down, with the foot of the injured limb raised high up. We then grasp the thigh with both hands, and place the thumbs, one over the other, on the pressure-point above the wound, as shown in the fifth picture. Then we press against the brim of the pelvis. A wound of the femoral artery is an extremely serious injury more especially if it be on the upper part, and the pressure here must on no account be slackened. When one helper is tired, another must take his place without any interval, putting his thumbs over those of the first helper, who then slips his away. No time must be wasted in removing clothes, the pressure must be applied immediately.

How to stop bleeding of the armpit.

If the wound of the femoral artery is in the lower part of the thigh, a tourniquet may be used. We already know how to make one from a pocket-handkerchief and a stick; the pad should be made of a stone or any similar hard object available, and should be about the size of a tennis-ball.

Stopping bleeding of the thigh.

A pad fixed at the back of the knee.

Bleeding from the popliteal artery, at the back of the knee, can be arrested by placing a pad approximately the size of a tennis-ball in the bend of the knee, and tying the leg back with a bandage in the manner shown above in the sixth picture. Should there be any difficulty in getting a pad, the trouser may be utilized by rolling it up to the knee and using it instead of a pad. Should such means fail to arrest the bleeding, a tourniquet must be applied to the artery at the thigh.

For wounds to the tibial arteries of the lower leg we find it necessary to use a pad and bandage. In case of injury to the foot, with bleeding, it is very important that the wound should be carefully cleansed, and all foreign substances, like pieces of glass, removed. Pressure can be applied with a pad and bandage.

Something must be said about methods adopted for stopping bleeding from a vein. Although in a general way not regarded as so dangerous as arterial bleeding, venous bleeding may be fatal, when large veins such as the jugular vein, which runs in the neck, are badly injured. We have already learnt how to distinguish venous bleeding by its dark red color and slow, continuous stream. In this case the patient must be laid down, and the injured part raised as high as possible. All light garments on the heart side of the wound should be gently removed, and pressure applied with the thumbs, or with pad and bandage in the same manner as in arterial bleeding. We must take care, however, in these cases of bleeding from a vein to press on the side of the wound farthest from the heart.

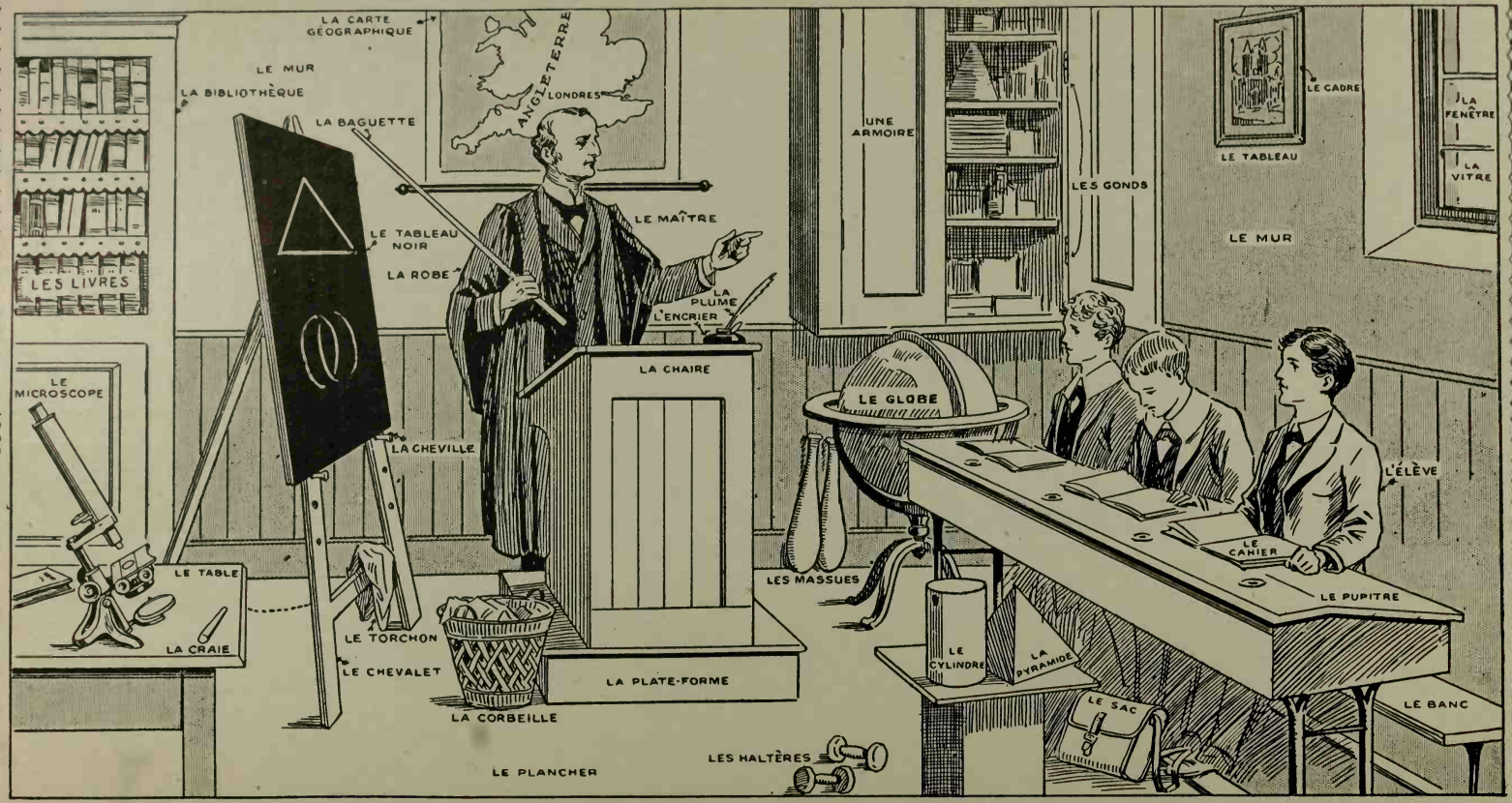
Internal bleeding may be detected by loss of strength, faintness, difficulty in breathing, a weak pulse, pale face and lips, a gasping for air, and very often total unconsciousness. It is essential that the patient be laid down, surrounded by plenty of air, and fanned. All tight clothing round the neck must be loosened, cold water sprinkled on the face and put to the lips for drinking, and smelling-salts held to the nose.

For bleeding from the nose the treatment is to set the patient near an open window, with his head slightly tilted back and his hands raised above the head. Tight clothing round the neck must be at once loosened, something cold, such as ice or a door-key, held over the nose and at the back of the neck, and if this does not stop the bleeding the patient's feet should be placed in hot water. He should not breathe through the nose but through the mouth only.

If blood comes from the tongue, throat, or a tooth, ice or cold water should be held in the mouth, and the carotid arteries should be pressed. A tooth ought to be plugged with a piece of clean lint or cotton-wool or linen. If the front of the tongue is bleeding severely, a piece of clean folded linen should be placed on the tongue and pressed down by using the thumb and finger above and below the tongue.

Blood that may flow from the ear must simply be wiped away carefully, and further attention left for a physician, as the ear is an extremely delicate organ which must not upon any account be tampered with.

A FRENCH LESSON IN PICTURE: THE NAMES OF FAMILIAR THINGS IN A SCHOOLROOM



This picture gives the French names for the familiar things in a schoolroom. Reading from the left, we have the books in a book-case, the microscope and a piece of chalk resting on the table, and the blackboard supported on the easel by the pegs. The duster and the waste-basket are below. On the wall hangs a map of England, in front of which the master in his robe stands at his desk on the platform holding the pointer. The pen rests in the inkpot on the top, on the floor below are dumb-bells, a satchel, and behind the globe Indian clubs. The pupils sit on the bench, with copy-books before them on the desk, in front of which are the cylinder and pyramid for a drawing-lesson. To their right is a cupboard with hinges of the door indicated, and behind them hangs a picture in its frame to the left of the window, with its panes of glass.

A FIRESIDE GAME FOR WINTER EVENINGS

THERE is a certain kind of sentence which is known as a palindrome, a word that means "running back again." The particular kind of sentence to which this curious name is given is one that can be read backward as well as forward, and will be the same either way; the letters "run back again" in the same order as they run forward. Of course, it is fairly easy to make sentences which read backward or forward if we consider only words, but in a palindrome we must read the sentence backward letter by letter.

A very good game for a cold evening, when we cannot go out, and need some quiet recreation that will enable us to sit round the fire, is to try to make up some palindromes.

Perhaps the best known of all such sentences are these two, the first being Adam's supposed remark to Eve:

"Madam, I'm Adam";

and the second, Napoleon's statement:

"Able was I ere I saw Elba."

But many other sentences can be made up to read backward and forward alike.

Repel evil as a live leper.

Nor I nor Emma had level'd a hammer on iron.

Snug & raw was I ere I saw war & guns.

No, it is opposed, art sees trades opposition.

Put it up but not on tub, put it up.

Stop, Rose, I prefer pies or pots.

In building up such sentences, we must, of course, work from the beginning and end at the same time—that is, directly we have chosen a first word, we must write it backwards at the end of the sentence; then a second word is treated in the same way, being reversed and placed as the second from the end. In this way we can see if our sentence is making sense as we go along. The best way to begin building up a palindrome is to get a number of palindrome words, such as madam, noon, and so on. These give a good foundation to use with other words that are not palindromes, but make true words when reversed, such, for example, as was, saw; den, Ned; ton, not; and so on.

Of course, it is quite allowable to break up the words in reading backwards, provided the letters run in the right order. Sometimes we can make a palindrome sentence by leaving out the "e" of a verb, and substituting an apostrophe; but in reading sentences backward we do not take into account stops or apostrophes.

It is often a help in making these sentences to use the ampersand form of and, &, instead of the word, but of course a sentence in which this is necessary is not so clever as one in which only proper words are used.

A POPGUN MADE FROM A QUILL

A QUILL popgun is an amusing little toy that any boy can make without expense. All that is needed is a good quill of fair size that we can make from a goose-feather by pushing out the pith. We cut the quill evenly at each end, and make it about three inches long. Now we take a raw potato, and cut it into slices about a quarter of an inch thick or a little more. We push one end of the quill through one of the slices of potato, and this will cause a piece of potato to stick in one end of the quill. Then we push the other end of the quill through a slice of potato, thereby getting a piece of potato at that end also. Now we make a piece of wood as shown in the picture. This is to act as the rammer. The thin part should be almost the size of the quill, and the thick end is to prevent it from going too far through the quill. Then, by pushing this rammer into one end of the quill, we can fire our popgun, which we can load as often as we wish by pushing the empty end into a slice of potato. The quill popgun makes very good amusement.

A popgun made from a quill.

ANSWERS TO THE PICTURE PUZZLES ON PAGE 4818

ON page 4818 we have a picture of a street scene in which the artist has purposely drawn many things wrongly. The observant reader will notice the following mistakes.

1. The lamp-post should stand on the pavement, and its ladder-arm is on the wrong side.
2. The notice of "Keep to the left" should read "Keep to the right," and is on the wrong side of the lamp-post.
3. The pavement has no curbstones.
4. The bars of the gutter grating are the wrong way up, and they should also be at right angles instead of parallel to the pavement.
5. The cyclist's front forks are wrong. .
6. The truck's handles are also the wrong way round.
7. The motor-car has the handle of its door and its taximeter in their wrong positions, and the license number is also drawn in its wrong place.
8. One of the window-sashes on the first floor of the middle shop is wrongly placed.
9. The words "To Let" are made to read from the inside instead of the outside, as it should.
10. In the right-hand corner of the picture the end of the hand-rail on each side of the steps curls the wrong way round.

THE NEXT THINGS TO MAKE AND THINGS TO DO BEGIN ON PAGE 5027.

A FIR-TREE LIKE A CORAL OF THE SEA

The myriad tiny crystals of sparkling white that cover this fir-tree in every part give it the appearance of a mighty coral from the ocean-bed. Every branch, and leaf, and needle seems to be delicately sculptured, and the beauty of this dazzling monument rivals the finest work of the little creatures that build up the coral islands of the Pacific. The beauty of such a crystal-covered mass needs to be seen to be appreciated.

The photographs on these pages are by Mr. James Leadbetter and others.

MASTER JACK FROST, ARTIST

CONTINUED FROM 4894

JUST before you reach the North Pole there is a dear little shop with two bow-windows, two steps down to the door, and two dormer windows in the tiled roof, which has inscribed on its front, in a perfectly charming design, the words: "Jack Frost, Plumber and Glazier."

I have not myself visited the shop, but I got the description which I have just given to you from no less a person than the owner and occupier himself, whom I chanced to meet one cold night in the north of New England.

The meeting was rather romantic, not to say exciting. I was staying at a strange inn on some wild hills, and went to bed in a nervous and excited state.

Well, I dropped off to sleep after a miserable hour of listening to creaking furniture, feeling all the time that I should certainly be attacked; and when I awoke, soon after midnight, it was with the certain conviction that I should have to fight for my life. There was a cracking noise from the window.

I felt desperately cold; indeed, I was shivering, and my teeth *would* chatter, however hard I tried to stop them. I glanced, with terrified eyes, across the darkness of the room, and there against the faint luminous square of the window was the grey shadow of a man who seemed to be only just outside. I was crossing the floor on the tips of my toes, when I heard the man outside the window singing, in a low voice, the following words:

I'm a cracker of pipes,
And a burster of drains,
But a *beautiful* painter
Of window-panes.

Amazed that any robber should sing at his wicked work, I stood still. The cracking sound continued, and the shadow began to fade till it was almost dim. As it faded I heard the voice outside singing cheerfully:

I give little boys cold,
And make little boys sneeze,
But I glorify gooseberry
Bushes and trees.

Before I took another step forward, the voice outside the window sang:

"Hullo, you inside there! Pull up the blind and take a look at my work."

Without pausing to think I advanced quickly, jerked aside the

blind, and saw, not a burglar, not a man at all, as I had expected, but a beautiful picture instead. For the whole window, from the eight panes in the top sash to the eight panes in the lower sash, was frosted over in a glittering iciness which not only caught the starlight outside at a thousand tiny points, but expressed some wonderful design full of beauty.

As I stood there, all of a sudden up shot the lower sash, a blast of cold air pierced me to the marrow-bones, and into the room sprang a wisp of a man with a very white face and a very blue nose.

"Name of Frost," he said in a sharp voice; "Jack Frost. Address, Icicle Villa, Snow Place, North Pole. Trade, plumber, glazier, and decorator."

I at once hopped under the bedclothes, and from that warm refuge said to my visitor:

"It gives me the greatest pleasure to make your acquaintance. I have heard of you before——"

"I suppose so; but you know nothing about me. You do not know that I live near the North Pole, in a neat little shop, with two steps down from the pavement to the front door, two dormer windows in the tiled roof, and a ribbon design over the front, announcing Jack Frost, Plumber and Glazier."

In answer to this, I ventured to reply:

"I know you are clever in turning water into ice, giving people colds, and making clouds come down as snow; but as to whether you are married, whether you are a Republican or Democrat—on these things I am ignorant."

He crossed his legs and said sharply:

"I am an artist. In point of fact, I am the greatest artist on earth. And it is far from encouraging to find that people do not recognize me as such."

"You should put N.A. after your name. That is the only means of knowing an artist in America."

"You're laughing at me!" said he.

"My dear fellow, my teeth are chattering. I was never farther from laughter in all my life."

"Look here, I'll explain how things are. You shall judge for yourself. You know how precious ugly it is in autumn after the leaves are down? You know how sodden the lawns look, how bare the trees look, and how muddy and sloppy and disagreeable the roads *are*? Well, those are my materials. At the worst season of the year I am sent for by Nature, and told to do the best I can with bare trees, sodden grass, and muddy roads. And just because I happen to burst a few water-pipes, and bring one or two gouty old gentlemen down on a slide, and set a few thousands of weaklings sneezing—I am abused by men and women, and not a single soul even praises my beautiful pictures!"

"Oh, come, now!" said I, "I've heard people praise a good white frost——"

"Bah! Have you ever heard of anyone sitting up at night to watch me cover a window with beauty? Why, man, it's the most glorious and difficult art in the world. You look at this one in the morning. Look at all its stars and mazes and white leaves. Look at them under a magnifying glass. And then, grass and trees, and paths and roads—all in one night—decorated as if a king were coming, decorated as no man, and no army of men, could do it, and nobody ever watching how it's done! When I'm at work, *all the world's asleep!*"

"I shall certainly sit up to-morrow night."

"But, mind you, you must look out that Tom Thaw doesn't come instead of me. He's a low fellow."

He sprang up, suddenly, exclaiming: "I believe he's stirring now! I think I hear him! Good-night, my friend." And, flinging open the window, he vanished into the night.

In the morning I saw how beautiful was his work. The whole hillside glistened under a white veil of exquisite loveliness, and the windows of the inn were crusted with beauty, each pane a picture showing the real genius and wonderful touch of Master Jack Frost.

THE NEXT FAMILIAR THINGS ARE ON PAGE 5001.

PICTURES IN JACK FROST'S FAIRYLAND

Very beautiful is the work of the frost in transforming the trees and shrubs of our gardens into a miracle of delicate filigree work that glitters and sparkles as the rays of the sun strike upon the tiny crystals of ice.

A tangled mass of twigs and branches, however dead and dull, becomes like a silver fountain, or a mass of swansdown, when the hoar-frost has come like some cunning craftsman and touched it with its magic finger.

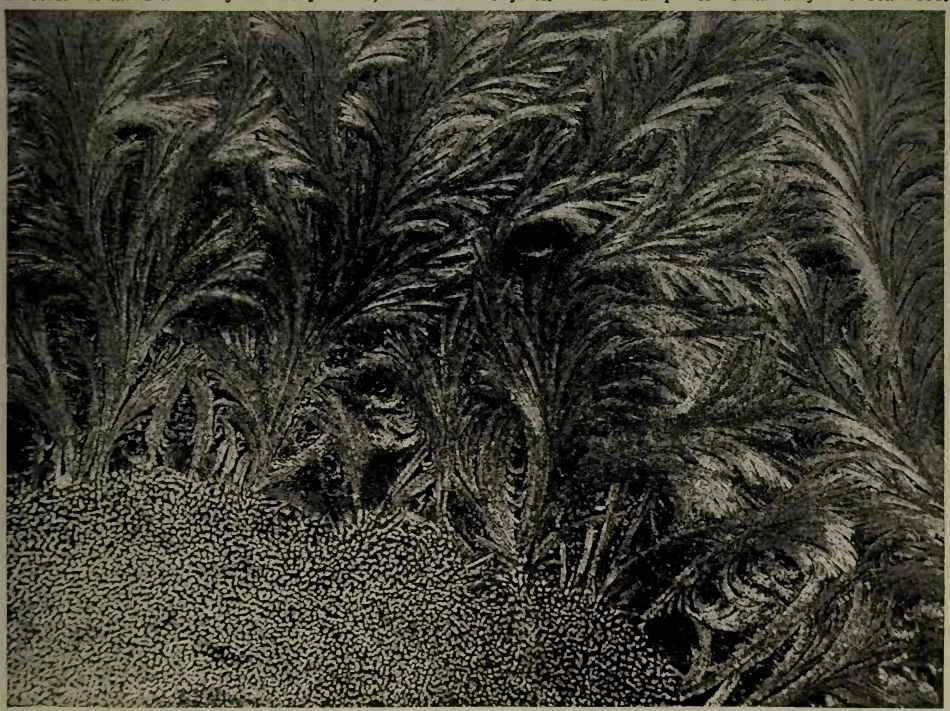
THE MAGIC TOUCH OF THE FROZEN DEW

The spruce fir, the Christmas-tree of our nurseries, is always graceful to look upon, but when every branchlet and needle is covered with the glistening crystals of frozen ice, the tree becomes a vision of loveliness.

After a slight hoar-frost we may easily trace the veins and margins of every leaf by the fringes of silvery white crystals that settle on these hard parts of the leaf, while the softer, warmer parts are merely wet.

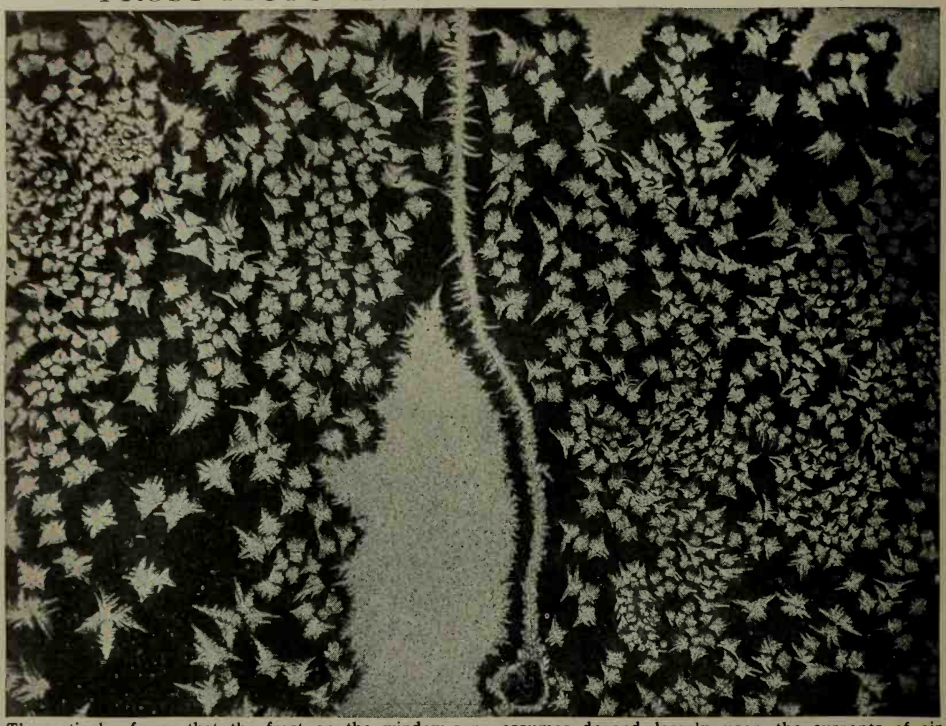
THE FROZEN VAPOR ON THE WINDOW

Not less beautiful than the hoar-frost out of doors is the delicate filigree-work traced on the window-pane indoors. It takes a variety of dainty forms, like natural objects. This example is remarkably like sea-weed.



Sometimes the frost draws even more beautiful patterns than that shown in the picture above. As the moist air in the room strikes the cold glass of the window it is frozen into forms like the most delicate feathers.

FROST PICTURES OF FLOWERS AND FERNS



The particular forms that the frost on the window-pane assumes depend largely upon the currents of air near the glass. Here, on each side of a long spiky stalk, we see a mass of what seems to be tiny blossoms.

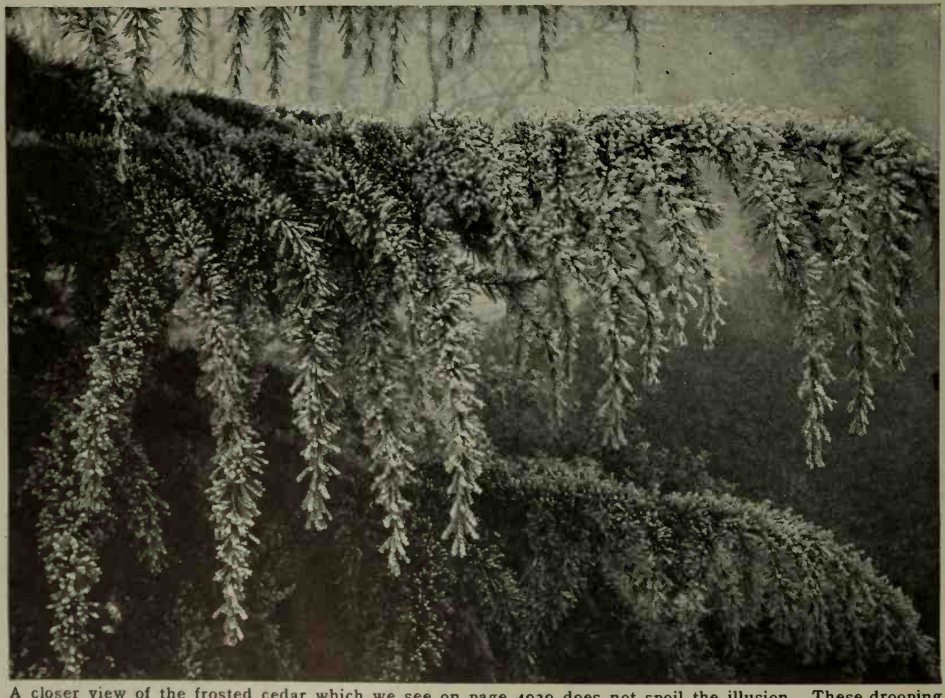
On this window-pane the fancy of Jack Frost has taken another, though similar, direction to that shown in the picture above, and we have a wonderful collection of dainty little fern-leaves, varying in size and shape.

A PYRAMID OF SILVERY FEATHERS

There is nothing commonplace about hoar-frost. It covers all the trees and plants with its jeweled mantle of dazzling white, and yet the result is never the same. Snow may cover the face of the earth till all things wear a uniform dress, but not so the frost. This cedar, like a pyramid of silvery feathers shining in the morning sun, was photographed in the garden of one of the Editors, as were all the trees in these pages.

A BUSH OF SPARKLING DIAMONDS

Nowhere is the work of the frost more effective and pretty than in the handling of bushes and plants that have a mass of thin branches and twigs; even the slightest stalk grows into a band of sparkling diamonds.



A closer view of the frosted cedar which we see on page 4939 does not spoil the illusion. These drooping branches, covered with glistening white, seem to be the tail feathers of some beautiful bird of paradise.

THE NEXT PICTURES OF FAMILIAR THINGS BEGIN ON PAGE 5001.

WHAT THIS STORY TELLS US

FEW of you know that, over a hundred years ago, a beautiful American girl married a handsome young man who afterward became a king in Europe. Her story is interesting though sad, for she was not recognized as a queen, and for this reason her enjoyment of life was destroyed. Her husband fared but little better, for he was soon driven from his throne, and his later life was not happy, though his nephew became the Emperor Napoleon III, of France, and treated his uncle with much kindness. Descendants of the unhappy pair still live in the United States.

AN UNCROWNED AMERICAN QUEEN

CONTINUED FROM 4797

WE all like to read about kings and queens, and very likely many of us have played we were royal personages, and pretended that our home-made cardboard crowns, notched and covered with gilt paper, were gold, flashing with diamonds and emeralds and other splendid gems. The finery we trailed around really was cast-off by our elders; but we saw only ermine and crimson velvet. As regally as we knew how we reigned in the attic or in the barn. On pleasant days we held court under the trees, with bobolinks in spring livery of black and buff, and orioles "drifting like a flake of fire," for musicians. Perhaps Rover, waving his plumy tail, even served as Lord Chancellor.

Very likely restless, self-willed Elizabeth Patterson, romping under the locust trees bordering the unpaved streets of Baltimore while her father entertained Washington, Jefferson and Lafayette, often played that she was a queen. She had many brothers and sisters, and we can imagine how readily they entered into the make-believe and strutted bravely as dukes and duchesses.

THE LITTLE BALTIMORE GIRL WHO HAD HER OWN WAY

From babyhood, little Betsy, as she was called, was remarkably pretty. She had large, dark eyes that joined her lips in smiling very winsomely—when she chose. Her skin was fair, and every one except her father spoiled her.

As she grew older, her ready wit and her excellent, though home-directed, education added to her position as daughter of one of the influential and wealthy men of the newly formed Republic of the United States. She became a belle, beautiful and headstrong. In her letters of later years she records that she always longed for power; but although as a young lady she doubtless expected to be one of the grand dames in the capital city, it is not probable that she ever really expected royal rank. There is, however, a tradition that as a child she prophesied that she would one day be one of the court ladies of France.

Her father always counseled moderation and less ambition; but she was keenly interested in great events and splendid careers and did not recognize the greatness of her country's founders nor see its future. All this was too near her. Instead, she, like many others, was watching the astonishing rise of Napoleon Bonaparte, as he suddenly flashed upward and onward from the small island of Corsica. His star was yet to set in still another island, St. Helena, when he was only fifty-two; but none could foresee that end, any more than Elizabeth herself could know that she would upset his plans and he, in turn, would frustrate her ambitions.

HOW DID KINGS COME TO BE IN THE WORLD?

Now, before you learn how she met and married Napoleon's youngest brother, Jerome, who later became

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King of Westphalia, let us remember that no matter how long a line of ancestors a king may claim, if we go back far enough we find that he is a descendant of some man who, from being a farmer, or fighter, or huntsman, or a shop-keeper, developed the power to lead, to control, to *reign*. Thus he "founded a dynasty," or was first of a "line," and the family continues to reign until revolution or some other cause gives another man the coveted realm.

During the later part of the eighteenth century Napoleon Bonaparte did this very thing. Born of a poor Corsican family, in youth he disliked French ways and habits as strange and foreign. You may read about him in many parts of THE BOOK OF KNOWLEDGE, and learn how his ambition and his great abilities had, soon after he was thirty-two, given him the title of First Consul of France. He was popularly called "The Regulator of Europe," and he also attempted to regulate his family and all their affairs. He tried to decide everything for his brothers and sisters, and quarreled with some of them because they married to suit themselves instead of him.

THE RECKLESS YOUNG BROTHER OF NAPOLEON

His brother Jerome wanted to enter the army, hoping to share in his military triumphs. But Napoleon, although afterwards acknowledging that he made a mistake, refused his request and put him in the navy instead—a precocious schoolboy. After some slight service in the Mediterranean he was sent to the West Indies. He soon tired of the life there, and, with no very good reason, and without consulting his brother, decided to visit the United States.

Jerome's unexpected arrival caused President Jefferson some anxious hours, for the newly established peace between the United States and England might be disturbed if he did anything for Napoleon's brother that would displease the English government. Yet he was expected to be polite to the brother of the ruler of France.

Young Bonaparte had several men with him; but it does not appear that it was generally known in America who he was until he accepted an invitation to visit Commodore Barney, who had served in the French navy, at his home in Baltimore. Jerome was not much given to thinking of consequences, and, while waiting for arrangements to be made whereby he might go back to France, he took every opportunity to enjoy himself. Therefore, when Barney, who was a son-in-law of one of the signers of the Declaration of Independence, proudly told the name and rank of his guest, it was not four days before the dark, handsome, debonair lad was accepting invitations from the social leaders of Baltimore, and had a very good time indeed.

Of course, the loveliest girl in Baltimore, Miss Patterson, met this gay young adventurer at once. It is told that when they first met, a gold chain that formed part of his fine uniform became entangled around her. She does not speak of this, however, when she relates that at the fall races, where she was attended by Jerome, she wore a buff-colored silk, a lace fichu and a large leghorn hat trimmed with pink tulle and big black plumes. Perhaps her thoughts then flew to a throne. Who knows?

THE MARRIAGE THAT CAUSED SO MUCH TROUBLE

Elizabeth was just sixteen, Jerome eighteen. Her father foresaw all sorts of trouble if he allowed the growing affection they showed for each other to end in marriage, for, according to French law, Jerome had yet to live seven years before he came of age. Any marriage that he would contract, should by rights have the sanction of his widowed mother, "*Madame Mère.*" Mr. Patterson did everything he could to keep the young people apart, even sending his daughter away from the city to his country seat. But she soon came back to Baltimore, against his wishes, and when he realized that "nothing short of force and violence could prevent their union," as he wrote to the American Minister in Paris, he decided to make the best of the whole matter.

Seldom had Baltimore society attended a more elaborate wedding than that on Christmas Eve, 1803. Everybody was interested; everybody talked a great deal. Mr. Patterson did everything he could do to make the union binding between his wilful daughter and the brother of the greatest man in Europe. All sorts of legal papers were drawn up, and the highest Catholic official in the city performed the ceremony. As he listened to Archbishop Carroll pronouncing the pair man

and wife, it is probable that his thoughts were anxiously searching the future.

But little Betsy was very happy, for as things far off seem more desirable than those nearer our grasp, she endowed the Bonaparte family with all that she ignored in her own. She quite overlooked the fact that her father's good Irish ancestors, of whom it is almost certain that Old Mortality (page 1776) was one, stood fully as high in all that makes for character as a Corsican official's son. She forgot that her father had stood shoulder to shoulder with Robert Morris in bearing the financial weight of the Revolution, and that he had done his part in forcing the surrender of Cornwallis.

YOUNG PEOPLE DREAMING OF A THRONE

To be sure, young Bonaparte was not a king; but although at the time of his visit to Baltimore his distinguished brother was only First Consul, he was the real ruler of France. Already there were signs of a future empire, and no doubt the young man tinged his headlong wooing of the girl, who strangely resembled not only his sister Pauline, but also Napoleon, both in face and mannerisms, with rosy-colored anticipations of a kingdom of their own. Why not? Napoleon had always looked after the family. Jerome's own recollections held little of the days of Corsican poverty, and a great deal of Napoleon's laughter at his boyish pranks and expensive tastes, and of Josephine's petting. Latterly, too, he had been counted a naval hero by the hero-worshipping French. To be sure, the event occasioning such a title was but the merest trifle that happened before he was sent to the West Indies, and was noticed only because of his brother.

Knowing, as we do, that all her long and eventful life the lovely Elizabeth was exceedingly vain, often spending hours admiring herself, either in the mirror, or by looking at the many paintings of her loveliness, it seems strange that she should have been willing to let Jerome be the more gorgeously clothed at their wedding. But she said herself that she thought her beauty would be all the more striking if she wore a scant little muslin frock of which she was fond, and she passed over the new and costly gowns for its exquisitely embroidered, sheer simplicity.

WEDDING GARMENTS WHICH WERE WORN IN 1803

Jerome's apparel was quite the reverse of simple. He was very smart indeed. He wore a gold-lace-trimmed, ornamented purple satin coat, and the long tails, reaching to his heels, were lined with white satin. His short satin breeches, silk stockings, diamond-buckled low shoes and powdered hair added to his height, and you may be sure many of the young people of Baltimore envied the handsome pair and thought they were sure to have a happy life.

The wedding was followed by a long round of delightful visits, that extended from Boston to Washington. The Bonapartes, except the "Sphinx of Europe," wrote of great good-will, but they reminded Jerome that, although Napoleon had achieved greatness, the rest of the family were still "common folk." But such letters were not to the liking of the young couple. Jerome was always planning to return to Paris, and his wife felt certain that if once Napoleon could see her, he would be won at once.

And now, you ask: Did Napoleon give them a kingdom? What opportunity did Elizabeth, one of the first American girls to contract an "international marriage," have as crowned queen to impress her personality on history?

HOW DID NAPOLEON TREAT THE AMERICAN GIRL?

No! Napoleon did not give them a kingdom. Although he afterward made nearly all of his near relatives kings and duchesses, whether the various countries wanted a change of sovereigns or not, he absolutely refused to recognize Jerome's marriage. It made lots of trouble all around, and on account of it the possibility of war between France and the United States was a general subject of conversation. Elizabeth's father tried to arrange the matter through the American Minister, and even sent one of Betsy's brothers abroad to see what he could do. Although Napoleon's ambition to be allied to royalty brought him little satisfaction, and did not help in building up and maintaining his power, he would not relent in the case of the American girl. He remained Elizabeth's resolute enemy until near the end of his career. Then, at St. Helena, he regretted the shadow he had cast on her life, and in speaking of her, said: "Those I have

wronged have forgiven me, while those I have loaded with kindness have forgotten me."

NAPOLEON MAKES THREATS TO HIS BROTHER

Many reasons kept the Bonapartes in America until after the splendidly imperial crowning of Napoleon and Josephine at the Cathedral of Notre Dame. You may be sure Elizabeth chafed at the delay, for she longed to shine with other beauties at court. Jerome, too, harassed by debt, grew anxious when he learned that his name had been left out of the list of Imperial Princes, and that the Paris papers were officially announcing that there was no truth in the report of his American marriage.

Finally Elizabeth's father fitted up a sailing vessel—the Erin—for them. They eluded the English cruisers that were still watching for Jerome, and arrived in Portugal. Napoleon was at that time in Italy, and he sent a messenger to tell his brother that he would never recognize the marriage, and that "Miss Patterson" would not be allowed to enter France.

Elizabeth was very angry when she heard this. "Tell your master," she said, "that *Madame Bonaparte* is ambitious, and demands her rights as a member of the Imperial Family!"

She did not gain her point. After much discussion, Jerome thought it would be best to take his secretary and go to his brother, show him his wife's miniature, and plead their cause. Then, he was sure, all would be well. Meantime she, with the rest of their party, including one of her brothers, proceeded to Holland to await the result of Jerome's intercession with his brother.

Napoleon was adamant. "Tell Miss Patterson," he said among other cruel things, "that you cannot change the nature of things. Tell her to go back to America and I will grant her a life pension, on condition that she does not bear our name."

Before Jerome's private secretary reached Amsterdam with his bad news, the Erin had sailed for England, because Holland, being practically French territory, was closed to the voyagers. At Camberwell, then "a village, two miles from London," but now a part of London's busy streets, Elizabeth heard the unwelcome tidings, and here, in the summer of 1805, her only son, Jerome Napoleon Bonaparte, was born. It is of interest to note that only a few years after this Robert Browning was born in the same suburb.

NAPOLEON REFUSES TO RECOGNIZE THE MARRIAGE

Napoleon was more angry than ever when he found that this unwelcome American girl had placed herself under the protection of his enemies, the English. It seemed incredible that any one should so dare to thwart his wishes and to defy his will. He tried to get the Pope to annul the marriage; and when he failed in that, he succeeded in having his own courts carry out his will, and the marriage was declared illegal—in France.

Thereupon, Jerome, forgetting his vows, forgetting his little son, since he was weak, self-seeking and extravagant beyond belief, allowed Napoleon to outline his future, and a marriage was arranged with the Princess Catharine of Würtemberg. This was more to the liking of Napoleon, and as a reward for obedience, he made Jerome King of Westphalia in 1807. When Napoleon fell, Jerome was driven from his throne also, for only his brother's strength had held him there. He had been the kind of king one would have expected, foolish, vain and extravagant. His former subjects were not sorry to see him go.

Elizabeth had returned to Baltimore when her son was three months old. For a while her husband's letters kept hope alive; but when she heard of Jerome's second marriage, she changed from a girl with a gay, joyous laugh to a cold, unhappy woman. Her love for Jerome turned to contempt. But of Napoleon she wrote, in late life: "Although the Emperor hurled me back on my hated Baltimore obscurity, even that shock could not destroy the admiration I felt for his genius and glory."

From this on, she spent most of her time in Europe. She had a pension from Napoleon and grew very wealthy, especially from property that her father willed her, although he never sympathized with her, and angrily said that "she abandoned all to seek admiration in foreign countries." She delighted in royal attentions and received many; but although very careful not to create unfavorable comment, she was never rec-

ognized as a queen. We can imagine the bitterness that this caused.

Finally one day, while in a picture gallery in Florence, she met her husband. He was with his second wife, Catharine. He whispered to her that they must leave the room at once, for the lady they had just passed was his "American wife." Thus did these two meet for the first and only time after they had so affectionately parted for what they supposed was but a brief separation.

Elizabeth met all of the Bonaparte family except Napoleon. She records that they were always quarreling about money, but adds that they were "lavish with kind words" to her. Her son was educated in Europe, but he was a thorough American, and from his Genevan school he wrote to his grandfather Patterson: "I have never had any idea of passing my life on the Continent. On the contrary, as soon as I have finished my education, I shall go back to America, which I have always regretted since I came here."

THE AMBITIOUS MOTHER REFUSES TO GIVE UP

His ambitious mother never lost hope that her son would be recognized as a member of the imperial family. *Madame Mère*, the mother of the five Bonaparte brothers, was interested in the young lad, and tried to arrange a marriage for him with one of his cousins, and Elizabeth was delighted. But it fell through, and although he visited all his European relatives, including his father, he returned to Baltimore in 1828, married an American girl, and became a successful lawyer.

When Napoleon III established the Second Empire, he was disposed to recognize the well-established claims of Elizabeth's son, Jerome, to legal rights of succession. The Minister of Justice upheld them, and the Emperor himself gave the papers to his nephew. This was very pleasing to the anxious mother; but the father protested, and the courts finally failed to give satisfaction to the American Bonapartes as represented by Jerome's first wife and son. Jerome was thoroughly selfish, and feared that if his son's rights were recognized, he might lose in some way.

Madame Bonaparte survived her son; but he had two sons. The elder, Jerome Napoleon Bonaparte, was a colonel in the French army, and died many years ago. The other, the Honorable Charles Joseph Bonaparte, has served his native country—the United States—with distinction and lives in Baltimore. He has been Secretary of the Navy, and Attorney General of the United States, and has held other offices of trust. He has never troubled himself about his royal cousins, and one of his sayings is well worth remembering: "He who serves his country well need not boast of an ancestry."

Elizabeth followed her husband's career, as she did that of all his family, and felt that his brave charge at the battle of Waterloo partially atoned for his many, many faults. She also knew of his unfulfilled desire to be King of Poland. As she grew older, her pride in having married a Bonaparte grew almost irrational. She spoke often of Jerome's love, and thought it had never ceased in spite of his conduct.

THE UNHAPPY OLD AGE OF A DISAPPOINTED WOMAN

Strangely enough, Madame Bonaparte's beauty never faded. She lived to be ninety-four, and although not one of the happy women of history, she was, owing to her unique and unhappy life, one of the most famous. She was born before the United States were formed, and when she died they numbered thirty-eight, with a population of 50,000,000. During her long life she knew queens, princes, philosophers, poets, cardinals, diplomats and nobles. She counted Washington, Jefferson, Hamilton, Aaron Burr, Lafayette, Louis XVIII, Talleyrand, Mme. de Stael, Maria Edgeworth and Tom Moore as friends. The Duke of Wellington, who defeated Napoleon at Waterloo, gave her the only thing she ever seemed to love deeply—a little dog. This may seem strange, when she had a son; but her love for him was so tinged with ambition that it would be hard to know which was the greater. She spent the last years of her life in Baltimore and devoted most of her time to managing her property.

Little Elizabeth Patterson, under the locust trees of old Baltimore, played that she was queen. Her beauty won a crown; but she never wore it. Her courage and vivacity carried her far; but she never learned that content is not in position, nor yet in place, but is in the mind.

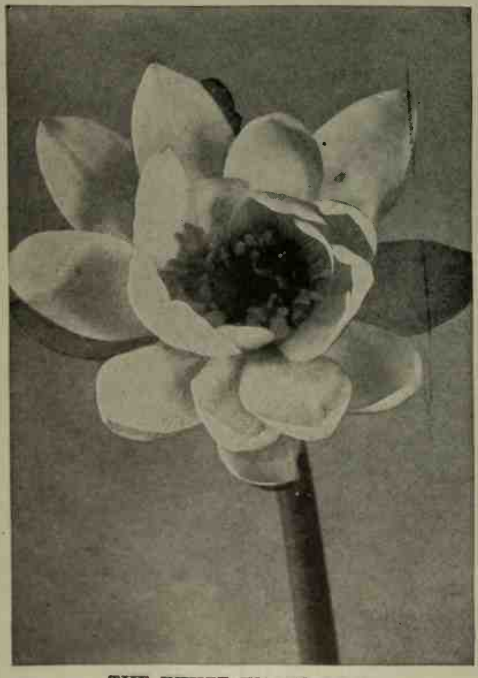
THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 5097.

THE WATER CROWFOOT

The water crowfoot is one of the buttercups. The flower is white, and often a sluggish stream will be a mass of white owing to the crowfoot growing in the shallow waters. Farmers use it for fodder.

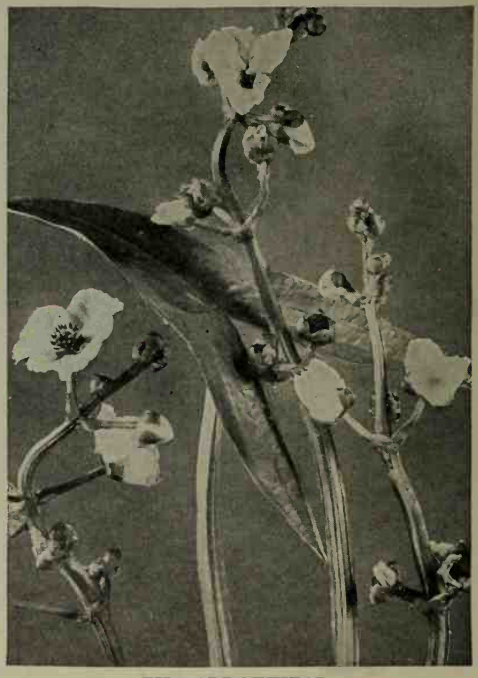
THE YELLOW WATER LILY

This flower has an unpleasant odor like alcohol, and in England is called the brandy-bottle. The submerged leaves are thin, but the floating ones thick and leathery. The Turks make a drink from the flowers.



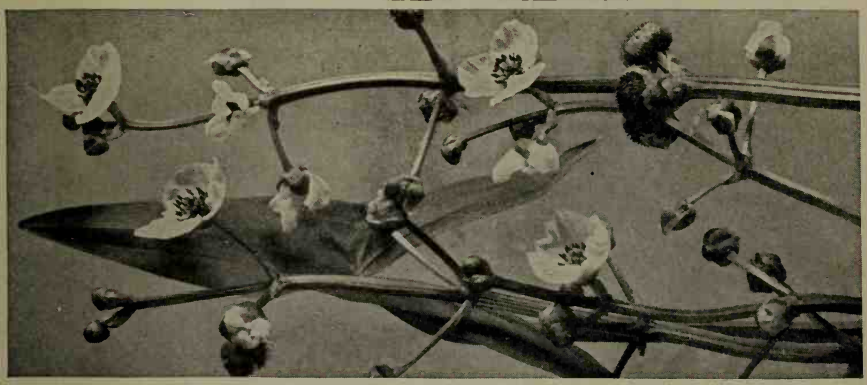
THE WHITE WATER LILY

While the flower of the yellow water lily grows an inch or two above the water, the white water lily is found resting on the surface, where it looks very beautiful. Many think that this is our handsomest wild flower.



THE ARROWHEAD

No one can mistake the leaf of the arrowhead, for it is in shape exactly like an arrow. The plant grows in shallow streams near the banks. The white flowers, marked with purple, are found in groups of three.



THE FLOWERS OF THE STREAM

CONTINUED FROM 4884

ONE general character strikes us when wandering by the stream in search of flowers—that most of the plants are tall and have comparatively slender leaves. This does not apply to those that float or spread their leaves upon the surface of the water; in these the leaves which float on the surface are very broad and greasy to the touch, so that the water rolls off. The reason for this character is that these plants have their air-mouths on the upper surface of the leaves, and do not wish to have them blocked up by drops of water.

The plants that stand up along the margins of the stream have two reasons for possessing slender leaves. They grow in crowds, and, as in the case of the grasses, the slender leaf allows a greater number to grow in a narrow space because it enables the light from above to benefit all; and as they have all the moisture they need at their roots, there is no need to collect more on broad leaves and convey it to the roots.

The plants whose broad leaves float on the surface of the stream have leaves of a very different shape under the water, where breadth would be of no value to them, and where, in order to obtain enough of the small amount of carbon-dioxide that is dissolved in the water, they must expose as large a surface as possible to it. This difference between the floating and the submerged leaf is shown well in the water crowfoot. This is a buttercup that has taken to living in water; though it might be more correct to regard the buttercups of the meadow as having descended from an ancestor that lived in water. When buttercups are grown from seeds, their first leaves are just the shape of the water crowfoot's floating foliage. In spring many ponds and parts of streams are covered with the crowfoot's white flowers.

If we can get a grown-up friend to hook out a plant, we shall find its stems are very long and soft, and from under-water branches a number of dark green, coarse hairs are produced. If, now, we put a piece of the plant into a glass vessel of water, we shall see that these hairs are really the fine divisions of the under-water leaf which spread in all directions; while the round or kidney-shaped floating leaves, which are merely divided into three or five broad lobes, are for the purpose of keeping that end of the plant up, so that the flowers can open in the air. These flowers are very similar in their appearance to those of the buttercups, except that the petals are usually white. There is, however, a yellow crowfoot found in some parts of the southern states.

Before winter comes the water crowfoot has thrown off its floating leaves and withdrawn its living portions largely into the mud, to be safe there until spring, when it will again grow. In the frogbit, which prefers still waters, we have a floating plant, for its roots never reach the bottom. The leaves lie flat on the surface of the water, and are either round or kidney shaped, green above and purplish beneath. The flowers are almost as large as the leaves, with three sepals and three thin white petals.

The frogbit has no stems to pull it downwards to a place of safety, and probably, if it remained on the surface, it might be destroyed when the upper waters were turned into thick ice. So, in the autumn, it sends out short shoots, and at the end of each develops a bud, which falls off and sinks into the muddy bottom, where it lies quietly all through the winter. In spring it wakes up, swells with growth, and rises to the surface, where it soon puts forth a great number of little floating leaves and roots. It flowers in July.

THE WATER SOLDIER

A near relation of the frogbit is known as the water soldier, because all its leaves are sword-shaped, like those of the flag, but their edges are strongly toothed like the edge of a saw. It is a native of Europe, but is frequently seen in aquaria, in which the plants thrive and spread quickly. During the greater part of the year it remains at the bottom. It has flowers like the frogbit, but larger, and when these are formed the plant rises to the surface.

THE WATER THYME

Yet another relation of the frogbit is the water thyme, which may be found in all sorts of fresh waters. It has long, brittle stems that are almost transparent, closely set with short, oblong leaves in whorls of threes. The purplish-green flowers are very small, and consist of three sepals and three petals.

THE WATER LILIES

The most showy of our floating water flowers are those of the two water lilies —yellow and white. In many places both may be found in the same water. They are not usually found where the water is more than fifteen feet deep, and they prefer places where there is no strong current. They are both rooted in the mud of the bottom, and have thick, fleshy root-stocks. The large, leathery, heart-shaped leaves that lie flat on the surface, and do not retain water on top, are much alike in the two species. But the flowers, even apart from their color, are very different.

The yellow water lily never opens wide, but always remains ball-shaped; it is entirely yellow—sepals, petals, stamens, and pistil. There are five or six large sepals, enclosing about twenty small and narrow petals, which bear nectar-glands.

The white water lily is not so common as the yellow, and is generally found on larger sheets of water. It has only four sepals, and these are colored green on the outside and white on the inside. They spread wide when the flower is open, and the numerous petals in several rows so dispose themselves that the flower has a very full and attractive appearance. The petals that are next to the sepals are large, and each row becomes smaller towards the centre, so that the only thing that marks them as distinct from the broad stamens is the presence of the anthers.

THE ARROWHEAD

Among the plants whose roots are in the bed of the stream with leaves and flowers in the air is the arrowhead, whose leaves alone will enable us to recognize it, though we may never have seen it before. They are of regular arrowhead shape, and while some lie on the surface, others stand up. Those that are submerged are thin and almost transparent.

A tall leafless flowering stem arises from the centre of the arrowhead leaves, and at regular intervals this sends off short branches in threes, each branch ending in a flower nearly an inch across. This consists of three green sepals and three white petals with a purplish base. The lower flowers have no stamens, and are smaller than those above, which have many purple stamens but no pistils.

The pistillate flowers develop into large round fruits. From the swollen base of the plant runners are sent in all directions, and at the ends of these, before the winter comes, tubers will be formed, into which all the materials of leaf and stem will be withdrawn, and next year each tuber will form a separate plant.

THE BUR-REED

The branched bur-reed is a large graceful plant, which lives in ditches and ponds. The leaves are sword-shaped, and the flowers of two kinds, some small and olive-colored, while the others are larger and green.

THE SNAKE'S-HEAD

This plant, also called the fritillary, gets the name snake's-head from the fancied resemblance of the unexpanded flower to a serpent's head. The purple flowers are not unlike tulips, but they droop from the stalks.

THE PURPLE LOOSESTRIFE

The purple loosestrife is a handsome plant, and its reddish-purple flowers, growing in tall spikes among the rushes of a ditch or stream, might be mistaken for foxgloves at a distance. It is often used as a tonic.

THE MEADOW-SWEET

This familiar garden flower, with creamy-white, fragrant blossoms and handsome foliage, well merits its other name of queen of the meadows. It is mentioned in old books as a useful and reliable medicine.

THE WATER PLANTAIN

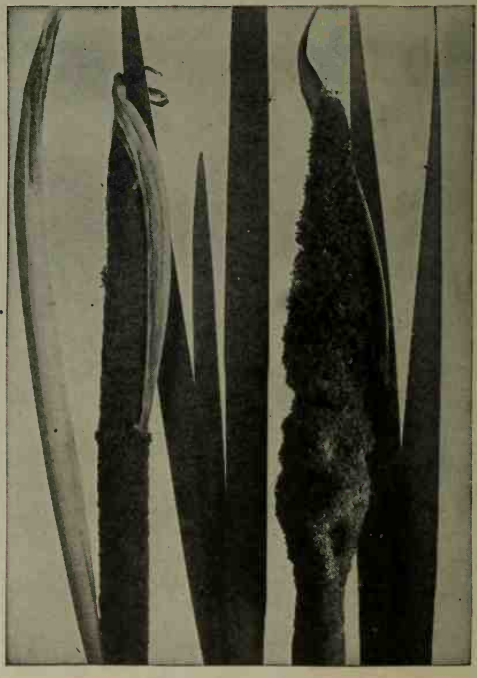
This plant is misnamed. It is no relation of the true plantains, although its large veined leaf is something like that of the greater plantain. The flowers are pink, and the plant is found in river, pond, and ditch.

THE FLOWERING RUSH

The flowering rush, which is not really a rush at all, is an attractive plant with tall stem of rosy-pink flowers, growing out of reach of the banks of the European streams. Before blooming it is unattractive.

THE GIANT DOCK

The giant dock, or great water dock, is a picturesque plant, frequently found on our river-banks. The lance-shaped leaves are more than a foot long, but the green blossoms are not very pleasing to the eye.



THE REED-MACE

The reed-mace, or cat's-tail, is often called the bulrush, although the real bulrush is a different plant. Hawkers in our large towns who sell the long spikes for ornaments, invariably call the plant the bulrush.

THE WATER AVENS

This plant is quite handsome with its slightly drooping flowers, reddish-brown in color. The stems and leaves are hairy. The name avens comes from a word meaning oat, and refers to the oat-like fruits of the plant.

THE SULPHUR-WORT

The sulphur-wort, or pepper saxifrage, is not a streamside plant, although it is often found growing in meadows by European streams. The flowers are a dull yellow, and the fruit, seen in the picture, dark brown.

THE WATER DROPWORT

The water dropwort grows on the water, and the lower leaves are submerged, the stems and leaf-stalks being swollen and hollow. The plant is used as a medicine, but it is harmful if taken without proper knowledge.

THE GREAT VALERIAN

The root of this plant is attractive to cats, and also to rats, owing to its smell, and rat-catchers use it to entice rats from their haunts. The pink or white flowers have a pretty effect in the swampy places where they grow.

THE WATER PLANTAIN

Similar in the shape of its flowers, though much smaller, is the water plantain. It is no relation of the plantain of the fields, but belongs to the arrowhead family. The flower-stem rises three or four feet above the water, is much branched, and bears a large number of flowers, similar to those of the arrowhead, but smaller, and of a pale rosy tint. Each flower is complete, with six stamens and twenty pistils.

THE FLOWERING RUSH

Another member of the arrowhead family is called the flowering rush, though it is only rush-like so far as its leaves are concerned. These are three or four feet long, straight and slender, but they grow quite erectly. The flower-scape is as long or longer, and the flowers are clustered in an umbel at the top. Petals and sepals are alike of a fine deep rose color, so that the flower appears to be six-petalled. There are six stamens and six pistils, all of a deep red hue. This is a handsome streamside plant of the Old World.

THE GREAT WATER DOCK

Where we discover the arrowhead, we may also come across a giant dock, with broad, erect leaves two or three feet long, and a great towering panicle of the quaint reddish-green flowers. This is the great water dock, a plant of striking aspect.

THE REED-MACE, OR CAT'S-TAIL

The leaves of the flowering rush may easily be mistaken for those of the reed-mace, or cat's-tail, which many people wrongly call bulrush—another plant altogether. If we trace the leaves of the reed-mace downwards, we find their lower parts wrapped round the flowering stem, which is not the case with the flowering rush; otherwise they are much alike in shape and size. The stem—an inch thick—rises to a height of six or seven feet, and the upper foot of it is the flower-spike, the greater portion densely crowded with hundreds of tiny dark brown flowers, whose sepals and petals are reduced to mere hairs. The mass of flowers has the appearance of a coat of velvet round the spike.

THE FRITILLARY, OR SNAKE'S-HEAD

That frequent, quaint flower of Europe, the checkered, purple fritillary, or snake's-head, is found only in American gardens, although similar fritillaries occur in Western North America, and their tiny bulbs are greatly prized by the Indians thereabouts as a food. They belong to the lily family, but the flowers are shaped much like small tulips, drooping from the top of slender stems, from which small leaves spring.

There is no distinction in shape, size, or color between the sepals and petals, alluded to as a six-parted perianth. There are six yellow stamens, and the pistil ends in three stigmas.

THE LOOSESTRIFE

Returning to our stream, we shall perhaps find purple loosestrife, which is also found in Europe, along its bank. It grows to a height of three or four feet, with an angled stem, clothed in lance-shaped leaves, which are usually in pairs, and more or less erect. The upper part of the stem bears whorls of six-petalled flowers red-purple in color. There are twelve stamens and a slender pistil; and in this plant we shall find differences in the length of the stamens, similar to those found in the primrose.

THE MEADOW-SWEET

The most plentiful of the streamside summer flowers in Europe is the meadow-sweet, a plant that, judging by the light, foam-like masses of small white flowers, we should not at first sight take to be one of the rose family. But if we look at the beautiful divided leaves, we shall remember that they are much like those of the agrimony and silverweed. The flowers, also, when regarded separately, will be seen to be not unlike those of blackthorn.

THE WATER AVENS

Another member of the rose family, though not so plentiful as several others, is the water avens, closely related to the common avens, or herb-bennet, of European roadsides. Its leaves are much like those of herb-bennet, which are really on a similar plan of structure to those of meadow-sweet, but with coarser lobes; but the flowers are larger—an inch and a half across—with purple sepals and yellow petals.

THE DROPWORTS

There are several of the umbel-bearers

THE MARSH WOUNDWORT

This plant, with its erect stem and flowers of a dull light red growing in a long spike, has a strong odor, though less powerful than that of its relative the hedge woundwort. It is common in marshes and rivers.

THE HEMP AGRIMONY

The flowers of the hemp agrimony, which grow in clusters at the tops of the branches, are much visited by butterflies. They are dull lilac in color, and the plant has an attractive appearance when in bloom.

THE WATERCRESS

The watercress belongs to the cabbage family. We all know it as used in salad, but its little white flowers are less known to townsfolk. It was introduced to New Zealand, where it often chokes up the streams.

THE YELLOW LOOSESTRIFE

Although the names are similar, this plant is not related to the purple loosestrife, which we see on page 4949. This belongs to the primrose family, and the fine yellow flowers are very conspicuous indeed.

THE WATER FIGWORT

European anglers know the water figwort only too well, for their lines become entangled in the seed-vessels of the plant as it grows by the streamside. The round flowers are a purplish chocolate in color.

THE BROOKLIME

This is another member of the figwort family, and is often found growing with the watercress and water parsnip. It was formerly used as a remedy for gout. The brilliant blue flowers are very handsome indeed.

THE GREATER SKULL-CAP

The skull-cap, with bell-shaped flowers of bright blue, growing by the side of the river or in a marshy spot, is always attractive. The leaves are lance-shaped with a toothed edge, and the plant often grows to 18 inches.

THE MARSH CAREX

This is one of the sedges, which have grass-like leaves and are found growing in various situations, some in rivers and marshes, others in bogs, and others by the seashore. Most of them need damp situations.

THE GIPSYWORT

The flowers of the gipsywort, which are white, dotted with red, are not attractive. It is the leaves, the most conspicuous part of the plant, that draw our attention to it as it grows by the pond, stream, or ditch.

THE WATER VIOLET

The large lilac flowers of the water violet, each with a yellow centre, are among the most attractive of the Old World blossoms; they grow in a kind of pyramid on the flower-stalk, well out of the water.

THE WATER MINT

We all know the lilac flowers of the water mint, found growing everywhere in wet ditches. It lends a bright touch of color to places where it grows in late autumn, when there are few other flowers in bloom.

THE WINTER-GREEN

The winter-green belongs to the heath family, and its scientific name is pyrola, from a Latin word meaning a little pear. This name was given because the leaves resemble those of a pear-tree.

known, in Europe, as dropworts, including sulphur wort, with gray-green, pipe-like stems, and a leaf that is little more than a long pipe-like midrib with a few narrow leaflets on each side. A much larger species is the hemlock water dropwort, which has broader leaves of a more parsley-like form, and small umbels of flowers more widely spread, because their foot-stalks are longer. This is a very poisonous and dangerous plant.

This hemlock-leaved water dropwort must not be confused with the water hemlock, or cowbane, one of the same family, with a similar reputation for poisonous properties. It has a stout root-stock, a tall, furrowed stem, and large wedge-shaped leaves that are much divided. Although the white flowers are very small, they are massed in large umbels, and the plant, as a whole, is attractive and imposing.

THE HEMP AGRIMONY

A European plant that may appear to have some relationship to these umbel-bearers is the hemp agrimony, but it is really a composite. Its flower-heads contain only five or six pale purple tubular florets, instead of the two or three hundred to be found in a head of daisy or dandelion, and these heads form small clusters, which are in turn massed into great clusters at the top of the four-foot stems. The leaves consist of three or five lance-shaped, drooping leaflets, which are somewhat like the leaves of hemp, while the complete leaf has a resemblance to an elder leaf. It is a close relative of the American boneset and Joe-Pye weed.

THE WATERCRESS

Here and there we come upon a stretch of streamside where, for some reason, no tall plants grow; and here we shall probably find the watercress, which most of us can recognize by its dark, brownish leaves, which are broken up into roundish leaflets, arranged in pairs along the midrib, and the small white flowers are clustered. A glance at the four petals and the seed vessels will show us that this is a cross-bearer.

THE FORGET-ME-NOT

With the watercress will probably be the forget-me-not, with its strangely curled spray of sky-blue flowers, each with a little yellow round the mouth of the flower-tube. It belongs to the same family as the beautiful viper's bugloss. Another relation is the comfrey, with three-feet stems, broad, lance-shaped, bristly leaves, and large tubular flowers of yellow or purplish color, which hang with their mouths downwards.

THE YELLOW LOOSESTRIFE

There are so many flowers along the streamside that it is impossible to mention them all. There is the tall-growing yellow loosestrife, no relation to the purple loosestrife, but a member of the primrose family. It has a stem four feet in height, with broad, lance-shaped leaves and pyramids of bright yellow, bell-shaped flowers, though they do not hang as bells do.

THE GREAT VALERIAN

Another tall plant is the great, or cat's, valerian, sometimes found in gardens, whose root-leaves are divided into pairs of lance-shaped leaflets, and whose small pale-pink flowers are clustered. This is the plant whose root-stock cats are so fond of that they tear it up if planted in the garden.

Rats are very fond of the odor of this plant, too, and it is said that rat-catchers often employ the root-stock to entice the rats from their hiding-places, in order to ensnare them.

THE FIGWORT AND OTHER FLOWERS OF THE STREAM

Then there is the figwort of Europe, with thick, square stems six feet high, large oblong leaves, and green and brown flowers shaped like a coal-scuttle, because that shape best suits the heads of wasps, who have a liking for its color and unpleasant smell.

The labiate, or mint, family is represented along the streamside by several kinds of mint, which remind us of their presence by their strong, sweet odor; and by gipsywort, skull-cap, and marsh woundwort. Gipsywort has oblong leaves in pairs on its square stem, and whorls of tiny bluish-white flowers dotted with purple. Skull-cap, with a similar arrangement of stem and leaves, has its large blue flowers in one-sided pairs. Marsh woundwort is a plant much like hedge woundwort, but shorter, with narrower leaves and paler flowers.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 5085.

The famous King of Assyria, Ashur-bani-pal, hunting wild beasts in the company of his attendants.

BABYLONIA AND ASSYRIA

LIFE IN THE WORLD 7000 YEARS AGO

CONTINUED FROM 4853

THE ASSYRIAN GOD OF DARKNESS

THE story of Babylonia and Assyria presents us with a view over the mists of Time just as vast and just as marvelous as that presented by Egypt. To get a clear idea of the relative positions of these two oldest countries in the world, and also of the points in which they are so much alike, let us imagine ourselves sailing in an airship over the mid-world desert from the Sahara to Persia.

There lies Egypt, a narrow valley in the great desert. Then, as our airship sweeps eastwards, we see below us, between the Mediterranean and the long, narrow Red Sea, shimmering in the hot sun, the Isthmus of Suez. Beyond this great "highway of nations" we cross over the wedge of desert which pushes up from the north of Arabia to the highlands of Syria.

Then we find ourselves looking down on another valley, also carved out of the desert. It is wider than that of the Nile, for here are two rivers, the Euphrates and the Tigris, which rise in the hills of the west and north, and flow south-east, more or less side by side, till they meet in one stream, which passes into the Persian Gulf. One of the old names for the land between and about these two rivers, and that by which it is best known, is Mesopotamia. Beyond the mountains that edge the Tigris basin we look down again from our height on the desert reappearing in the plateau of Persia.

That there had been a great past in the land between the rivers was known through all time, not from gigantic monuments still standing, as in Egypt, but partly from the echoes of old stories and legends handed down from generation to generation, partly from accounts of kings of the country who were closely connected with the history of the Jewish nation, and partly from the writings of old authors, such as Herodotus, who visited the country in the course of the centuries.

But the sad face of the land itself was silent and expressionless as to the details of that past. At least, so it seemed till about a hundred years ago, when first one traveler and then another began to wonder at the great mounds which are dotted all over the flat country.

Sometimes Arab villages are built on these mounds, and crops are

cultivated on their sides; in spring they are gay with wild flowers. There are most interesting models of some of the mounds in the Louvre Museum in Paris, and both the French and English nations were at last roused to send explorers to dig down into them to find out what secrets they held. Little pieces of carved marble had been washed out by the heavy rains, and had given an idea of what might lie below.

THE LOST EMPIRE THAT LAY BURIED UNDER THE DUST OF AGES

Just then the world was waking up to feel real interest in finding out the truth about the past, by collecting and studying the treasures that Mother Earth had kept so long in safety.

In course of time, with infinite labor and difficulty, delays and dangers, the explorers, French and English, succeeded in showing that in the mounds, hidden under the dust of ages, lay the remains of the life of the great past in the valley of the two rivers, whose records it had been long thought were entirely lost.

As more mounds and sites are dug over, not only in Mesopotamia, but in the surrounding countries, the study of the remains found in them unfolds the long, absorbing story, chapter by chapter. And the surpassing wonder of it is that these records had been buried, out of sight and out of memory, for more than 2,000 years.

Now, the remains of the mounds are very different from those of the tombs of Egypt. To begin with, there are no mummies, no personal possessions like those that brought us into such close touch with the old Egyptians, no vivid colored paintings, no illustrated papyri. At first sight, when walking about the Babylonian and Assyrian galleries in the great Museums, the man-headed monsters of grey stone, the slabs carved with rather confused-looking reliefs, the clay cylinders and little tablets like cakes of soap, covered with writing, the small roller seals, may almost look uninteresting and dull when contrasted with the dolls and toys, furniture and shoes, of the fine Egyptian galleries.

THE LITTLE GREY CYLINDERS THAT UNVEIL A WORLD OF WONDERS

But as we look into them the apparent dullness vanishes as by magic, for by their means we are carried right into the gorgeous palaces of the kings of Assyria, whose names and doings are so familiar to us in Bible story; and centuries farther back still, we are led into the busy country life of old Babylonia, when the rivers, kept in by embankments and connected by canals, were covered with boats and barges, filled with the produce of well-watered and fertile fields. We can almost smell the sweet hay, and see the chaff flying, and hear the cattle lowing, and enter into the bustle of sending these things to market—all more than 4,000 years ago.

By their means, too, we are enabled to enjoy first hand particulars of the gorgeous temples of the Sun and Moon gods, from whose worship Abraham fled, to found a nation that was to own only the one unseen God.

For a key to the writing that covers so many of the remains of the mounds was found in due course. At first people were almost more hopelessly in the dark about the meaning of the endless combinations of arrow-headed signs than they were about the Egyptian writing, and there was no stone found like the Rosetta stone—about which we may read on page 4844—that could be studied, with a known language like Greek upon it, as a basis for translation.

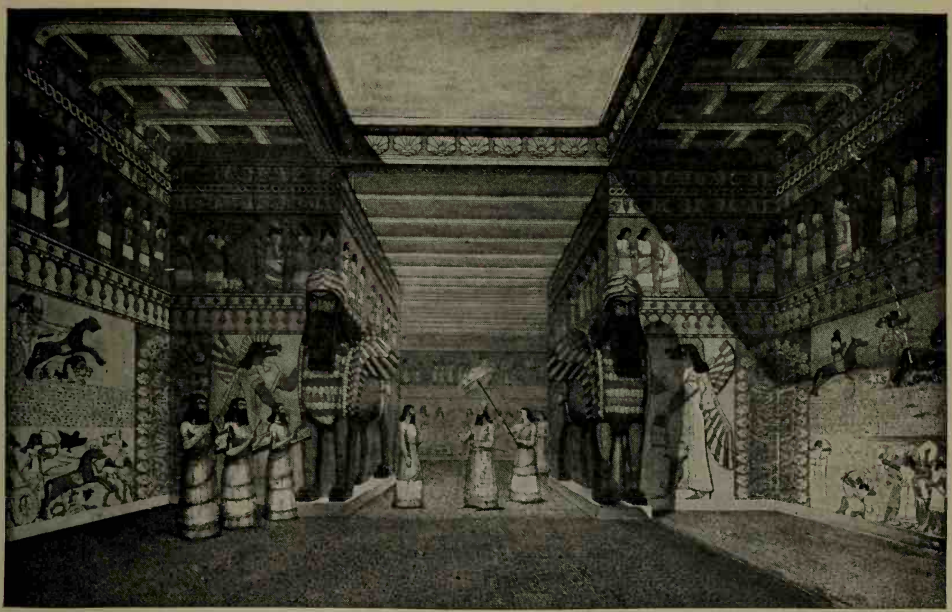
A MAN WHO SWUNG OVER A ROCK TO GET THE KEY OF THE PAST

But a dauntless traveler in the neighboring country of Persia saw on the face of a high rock an inscription in three languages. His ladders were too short to reach it from below, so he had himself slung down from above, and obtained, with the greatest difficulty, the squeezes —copies made with damp paper which look like the raised letters for the blind— of the writing on this rock at Behistun.

Scholars spent many years in patient labor, comparing these inscriptions with others that were found from time to time. Gradually, by studying a known language that was derived from the same stock as one of the three on the rock, they came nearer and nearer to solving the problem, till at last success crowned their efforts. They had the joy of being able to receive the message of the long-buried past, which, as one of the old kings said, had been written on the stones and clay, for all nations and for all time.

On the stone monsters, and on the slabs and monuments and walls of the temples, the wedge-shaped signs, or

A PALACE OF ASSYRIA IN GLORY & IN RUIN



This picture shows what an Assyrian palace must have been like in the days of Nineveh's greatness. The massive walls are covered with realistic hunting and battle scenes, beautifully colored, while towering above the king and his courtiers are great winged creatures, of which we may see examples in the Metropolitan Museum. In such beautiful palaces lived the cruelest kings of whom history makes any mention.

Sir Henry Layard was one of the pioneers of Assyrian research. Digging beneath a mound at Nimroud, near the River Tigris, which he supposed to be the site of an ancient city, he discovered the remains of a palace, and among other relics that he sent home to the British Museum was a huge winged bull with a human face. Great difficulty was experienced in lowering it for conveyance to the river, and when it was getting near the ground all the supporting ropes suddenly broke together. The bull fell, but was not injured.

cuneiform characters, as they are called, were chiselled out with tools; on the clay cylinders and tablets they were impressed, while the clay was still moist, by a stylus with a specially shaped point. Afterwards the cylinders and tablets were dried in the sun or an oven.

THE BOOKS OF STONE AND CLAY THAT NOTHING COULD DESTROY

These cylinders and tablets are the books and letters of the country, and in spite of the destruction by fire of the buildings in which they were preserved, in spite of occasional damp to which they have been subjected during their long burial, these old books and letters have remained indestructible.

Now, the story of Mesopotamia has not been like that of Egypt—one more or less unbroken whole, through several thousand years. The language, writing, and religion of the country have not remained the same, nor was it all the time under more or less the same form of government.

As we pass along the centuries in the valley of the Euphrates and Tigris, we shall hear of an entire change of race in early years, of a mighty division in the country later on, of incessant and terrible wars, not only between the rival kingdoms of Babylonia and Assyria, but with all the nations round. Among these were, on the west, the Hittites, the Syrians, the Canaanites—part of whose land was taken by the Hebrews when they came out of Egypt; and on the east, the Elamites, the Cassites, and the Medes and Persians.

In Mesopotamia, the earliest people that come into history were of the same Mongolian stock as the Chinese and Finns, and they pushed out a still earlier people, of whom little is known. When Menes was building his capital, Memphis, and turning the course of the Nile to make more room for it, as we read on page 4846, there were already many large cities, each with its powerful ruler, near the mouth of the Euphrates—quite a different mouth from that which exists to-day.

THE RIVER THAT HAS DRIVEN THE SEA FARTHER AND FARTHER BACK

There is no strong current in the Persian Gulf, as in the Mediterranean, to wash away the sediment of sand and mud brought down by the rivers which once had separate mouths. So all through the years—and it is still going on—new seashore has been formed of that sediment, ever pushing back the waters of the gulf. Scholars have calculated how long the miles of new seashore have taken to form, and by that means they guess at the age of the old cities which were seaports when first built, but whose sites are now far inland.

This lower part of Mesopotamia, the gift of the two rivers, is often called Chaldæa, especially in the Bible, and very old names for it also are the Land of Shumer, or Sumer, and Akkad.

The Sumerians and Akkadians, the Mongol peoples who are believed to have come down from the heights that surround the wide plain, made of it a very fertile land, with good tillage and drainage and irrigation, so that they could grow grain and dates and figs, and could keep much cattle in the rich pastures. These ancient people were great temple-builders too, as is shown by the bricks and gate-sockets, stone slabs, and other remains found in the old cities of Ur, Shirpurla, Erech, and others.

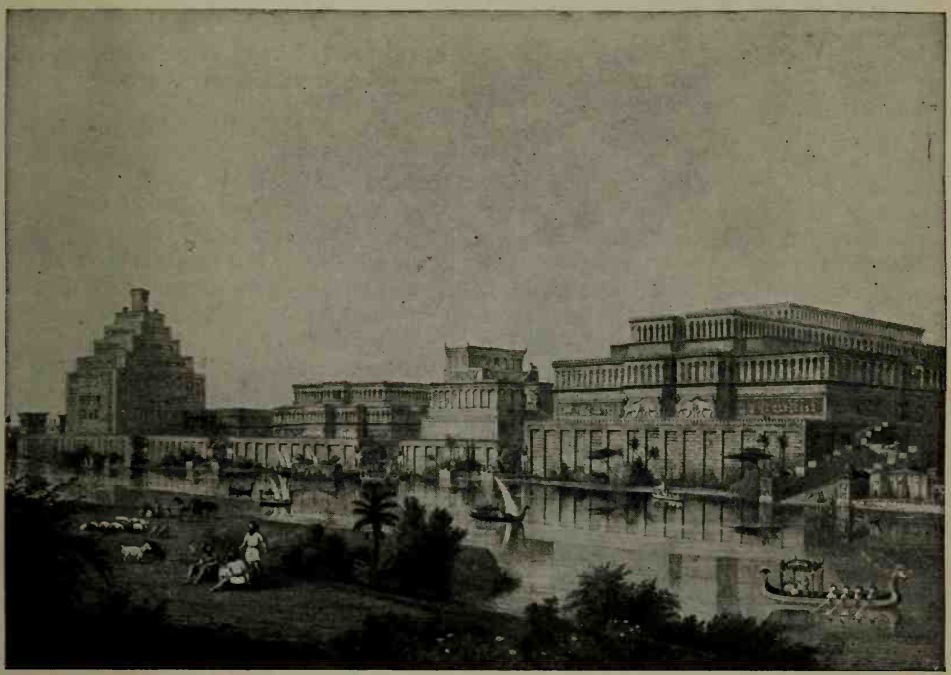
THE OLD DICTIONARIES THAT WE CAN SEE IN THE BRITISH MUSEUM TO-DAY

As long as 4,000 years before Christ, their language was quite formed and full, and was expressed in a picture-writing, modified as the years went on, somewhat like that of the old Egyptians.

These Sumerians—all shaven and shorn in the portraits that have come down to us—loved learning of all kinds as much as they loved agriculture and building, and when, about 3,800 years before Christ, they were conquered by a race of quite different stock, with beards and flowing hair, who had long lived to the north and west of them, they were not driven out. They taught these Semitic invaders much of their civilization, and gradually, through many centuries, the races fused together, and the country became known as Babylonia, from its capital, Babylon, on the banks of the River Euphrates.

The old language, in which were written accounts of the religion and laws, lasted for a long time, and was learned by the invaders as they settled down, by means of grammars and dictionaries and translations which we can see in the cases of the British Museum to-day. Just as the Roman alphabet is used nearly all over Europe in which to write various languages, so the old Sumerian

THE PALACES OF ASSYRIA AND BABYLON



The rulers of Assyria built for themselves many magnificent palaces and temples. One of their most wonderful palace-cities was Calah, about twenty miles from Nineveh, and from this picture we get some idea of its splendor when in the height of its prosperity it was the capital of the empire under King Ashur-nazir-pal. It was in a palace at Calah, now called Nimroud, that the great bull shown on page 4959 was found.

Babylon, under its later kings, was, like the cities of Assyria, a place of glory and beauty. Neither money nor labor was spared to make it the most magnificent city the world had ever seen. But while it was given up to luxury and revelry, the Persians turned the River Euphrates from its course, and, marching along the dry bed of the river, captured the city. The tower in the middle of the picture is the temple of Bel.

picture-writing, which gradually developed into wedge, or arrow-headed, signs, was used not only by the Babylonians and Assyrians themselves, but by many of the nations around. A great name stands out among the rulers of the newer race, that of Hammurabi, King of Babylon, who lived more than two thousand years before the time of Christ, and may have been living at the time that Abraham and his family are believed to have made their hasty departure from Ur of the Chaldees, to wander with their flocks and herds in the lands on the other side of the desert.

THE JUST LAWS THAT GOVERNED MEN FOUR THOUSAND YEARS AGO

One of Hammurabi's many claims to greatness is that he was a fine law-giver. Some say that his code of laws is the oldest in the world. We can see a cast of the pillar on which he inscribed them in the British Museum. His portrait, with a long beard, is at the top, and shows him in the act of receiving the laws from the Sun God. He set up many copies of the pillar, so that his subjects in different parts of his dominions could find out their just rights before going to law.

Some tablets, round in shape, deal with the measurements of fields and estates, and bring a picture before our eyes of the carefully tilled land. Boundaries were often difficult to keep in such a flat country where floods frequently happened, in spite of all the work done on the embankments; hence the number of boundary stones that have been found of all dates, inscribed with pictures and writing.

Other tablets of a square shape relate to the wages of the workers in the fields, children as well as men and women, and to the levying of taxes and all sorts of business which had to do with loans and repayments, and the buying and selling of houses, fields, slaves, and many kinds of goods.

THE GREAT PLATFORMS ON WHICH THE TEMPLES OF BABYLON WERE BUILT

The great industry of the country, besides agriculture, was brickmaking, for stone was very scarce, and clay was abundant. Enormous numbers of bricks were needed, for it was customary to set up the great buildings, temples, and palaces, on huge platforms made of sun-dried bricks, which raised them out of the way of the floods. Harder bricks were used for facing and ornamental purposes, many of which bear the names of kings and accounts of the buildings they set up. It was the custom, too, to build high, broad walls of brick round the large cities.

HOW ASSYRIA WAS FOUNDED

All the time that building, agriculture, and trade were thus flourishing in Babylonia, the people were becoming more and more numerous, and at last they began to go out as colonists northward, in the higher valley of the two rivers, where the country rises towards the hills beyond, and the climate is more bracing. They built large cities, of which Nineveh, on the Tigris, was the chief, on much the same plan as of old. They were erected on raised platforms, though natural hills were near by, and they used the same sort of brick, though quarries of building stone were within easy reach.

Centuries passed, and the people became strong enough to break off from Babylonia, and their country, under a king of their own, became known as Assyria, which means the land of the god Ashur. This was about the eighteenth century before Christ.

THE FINDING OF THE TABLETS THAT TELL THE STORY OF THE PAST

The Assyrian character, influenced no doubt by the more invigorating air of the northern country, became more bold and warlike as time went on. Less interest was taken in the peaceful pursuits of trade and farming, and a great passion for war and conquest took its place, partly, perhaps, forced on them by the constant attacks of the powerful nations that lived round about.

As far back as the time of Hammurabi there had been fierce struggles between the Babylonians and the Elamites and their northern neighbors the Cassites. The Cassites succeeded in overthrowing the Babylonian kings, and their power lasted in Babylonia some time after the great division of the two kingdoms. We read on page 4847 how the kings of Egypt gradually extended their power across the Isthmus of Suez and over the states that lay between them and the great kingdoms in the valley of the Euphrates and Tigris. Amenophis III. made these states pay tribute, and he took great delight in hunting lions in these countries.

He married a lady of Western Asia, who influenced her son so much towards the religion of her country that he gave

UPPER PART OF THE STELE OF HAMMURABI

This stele or tablet of King Hammurabi, the builder of the Babylonian Empire, is inscribed with the famous code of laws drawn up by the king for the governing of his people. These laws were written in forty-nine columns of hieroglyphics. At the top of the tablet the king is represented as in the act of receiving them from the Sun God, Shamash, who is seated on a throne in the form of a temple facade, with his feet resting upon the mountains. This stele is one of the most important sources of information upon the life and customs of the people of the time. This greatest King of Babylon constructed the famous Royal Canal of Babylon and a great promenade along the river Tigris. He was interested in securing justice and was proud of being called "the king of righteousness."

up the old Egyptian religion and set up a temple in a new city on the Nile, in which to honor the splendor of the sun's rays. In the ruins of this city were found the famous Tel-el-Amarna tablets, inscribed in the arrow-head, or cuneiform, writing. They opened up a whole chapter glowing with life of most interesting history, hitherto quite unknown, of the relations between the kings of Egypt and the kings of Western Asia in the fifteenth century before Christ. There is a table-case full of them in the British Museum, with translations beside them. Egyptian governors of provinces in Asia beg for help against rebellious subjects and for supplies of food. Proposals of marriage for princesses of the royal houses are made with due ceremony, and much discussion follows as to dowries and presents, such as chariots and horses, gold and ivory.

Incessant war seems to have gone on in the fourteenth century before Christ between Babylonia and Assyria, in which the Cassites were much mixed up, and a century later Assyria conquered the old mother-country of Babylonia under a king named Tukulti-Adar I. With few intervals, for some centuries Assyria held the proud position of leading power of Western Asia.

KING DAVID'S FRIEND, THE WARRIOR KING OF ASSYRIA

One of the most interesting of the early Assyrian kings is Tiglath Pileser I., believed to have been the friend of King David; he lived towards the end of the twelfth century before Christ. There are delightful accounts in his cylinder inscriptions of the expeditions of the doughty old warrior, especially of the one he made when he "mounted" a ship, evidently for the first time, for a trip on the Mediterranean, in company with his allies, the sea-faring Phœnicians.

The kings who reigned during the two and a half centuries which covered the time of Assyria's greatest glory and power were notable men, and it is their palaces and temples that have been dug out of the mounds of Nineveh and its neighborhood by Monsieur Botta, Sir Henry Layard, and other great explorers. It was to these palaces that the kings returned in pomp and triumph after vanquishing and sending into exile many of the neighboring nations, including the people of Israel.

It cost great labor and anxiety to bring from the banks of the Tigris to those of the Thames the huge man-headed bulls of ancient Assyria. They are wonderful both in form and in size. The rows of curls in the hair and beard are in the typical Assyrian fashion. The great wings are finely carved, and there are five legs to each. These monsters, with the strength of a bull, the swiftness of an eagle, and the intelligence of a man, were set at the entrances of the grand palaces so that they should look well both from the front and the side.

THE GREAT WINGED MONSTERS GUARDING THE FOOTSTEPS OF THE KING

"Guardians of the footsteps of the king" these monsters were called, and imposing they must have looked when set up in their original places, in the wide courts lined with pictured stone slabs, glowing at that time, it is believed, with brilliant colors. It is those slabs—enough have been brought over land, river, and sea to line the walls of several galleries at the British Museum—that tell us all about the footsteps of some of the best known of the kings of Assyria in the time of its greatest glory, from the ninth to the seventh century before Christ.

They were all great warriors, great builders, and great hunters—and three of them, at least, were great collectors of books.

From the grave-mound of the ancient city of Calah were dug out the remains of the palace of Ashur-nazir-pal, a long name that means "Ashur protects his son." Very lifelike are the portraits in relief on the slabs, showing Ashur-nazir-pal conquering his enemies, on the march and crossing rivers. Particularly interesting are the pictures of soldiers swimming on skins blown out like air-balls, also those of the horses swimming quietly behind the barge which carries the king's chariot. Very imposing does the king himself look as he pours out offerings to the gods over the dead bulls and lions he has killed.

A BLACK STONE THAT TELLS THE HISTORY OF A FAMOUS KING

The son of Ashur-nazir-pal, Shalmaneser II., also built a palace at Calah, and on a famous black obelisk of his we have the account of the expeditions he made during his long reign. The sculpture is in bands, and shows processions of the conquered peoples bringing tribute of dromedaries, elephants,

apes, and horses. The second band is very interesting to us, for it records the tribute of Jehu, King of Israel, consisting of all kinds of vessels of gold. Tiglath Pileser III., called by his Babylonian name of Pul in the Bible, lived about a hundred years after Shalmaneser II. His inscriptions and pictured slabs show him to have been very warlike. We see him assaulting a city, the gods being borne off in procession; in another place he is standing with his foot on the neck of a foe.

In still another picture we may see flocks and herds being driven away, and women and children being taken off in a cart. It was Ahaz, King of Judah, who asked Tiglath Pileser III. to help him against his enemies, with the result that the terrible doom of being carried into captivity fell first upon the Israelite tribes across the Jordan.

CARRYING THE CONQUERED PEOPLE INTO DISTANT LANDS

This plan of carrying away conquered peoples far from their homes, and replacing them with others from some other distant part of the empire, caused bitter suffering through the years of Assyria's greatness, as the wailing dirges of the Jews, which we still sing and read in our services, remind us: "By the rivers of Babylon, there we sat down, yea, we wept, when we remembered Zion."

When Sargon became King of Assyria he took Samaria after a long siege, and sent its inhabitants far away from their homes to settle beyond the Euphrates. From his splendid palace near Nineveh came the fine man-headed bulls, and the cuneiform writing upon them tells of his expeditions; so does that on his cylinders found among other historical records.

The cylinders of Sargon's famous son, Sennacherib—so well known to us in Bible story—may well be full of most interesting details, for he fought many campaigns, and built and restored many palaces. The slabs from one of these, now in the British Museum, are of absorbing interest, for they show in graphic manner how the great palaces in Assyria were set up. We can distinguish the files of men making the platform mound on which the buildings were raised. They mount with loads of stones, bricks, and earth, hurl them down, and then descend to refill their empty baskets and hasten up again. Great crowds of workers there are in every direction—surely slaves and prisoners, for all are kept in order by overseers and taskmasters with threatening sticks in their hands.

THE BUSY SCENE WHEN THE WINGED MONSTERS WERE MOVED ABOUT

Numbers of them are straining at long ropes, hauling a sledge running on rollers, eased by wedges of stones and a powerful lever worked by pulleys. On the sledge is one of the monsters to be set up as "guardian of the king's footsteps." His curls and sash are not in place yet, for he is still in the rough, fresh from the quarry from whence he has come by boat.

We can see the boats or rafts made of trunks of trees lashed together on the river shown close by, with the eels wriggling about, and the little pigs with their mother among the reeds.

But we must turn again to the workmen, hastening hither and thither with all sorts of tools and building materials, and from them to the impassive soldiers keeping guard over the person of Sennacherib himself, gorgeous in patterned cap and fine tunic, standing in his splendid car, with a fine umbrella over his head, and fly-flaps waved by attendants. It makes us think of the Pharaohs watching the rising of the Pyramids.

What heat and dust and noise the whole scene suggests! Over the king's head runs the inscription: "Sennacherib, king of multitudes, king of Assyria, had the bulls and colossi set up with joy. They were made in the land of the Baladon—near the source of the Tigris—for the palace of his lordship, which is within Nineveh."

THE GREAT CART THAT THREE HUNDRED MEN COULD NOT PULL

More than three hundred men were needed to pull the cart on which one of the Assyrian bulls was placed, some twenty-six centuries later, when Sir Henry Layard had it dug out of the mound, and astonished the natives by sending it home to England.

There is a picture on another slab of Sennacherib sitting on an armchair sort of throne, receiving from his chief officers the report of the taking of the city of Lachish. Flushed with his success, Senna-

cherib sent a threatening message to Hezekiah, King of Judah, who had dared to withhold the tribute he had agreed to pay. As the King of Egypt had encouraged Hezekiah to take this bold course, Sennacherib was furious with him too, and hastened down to the borders of Egypt to settle with him first. But the battle was never fought. By a plague or some other great disaster the flower of the army perished in one night, and Judah, as well as Egypt, for the time escaped.

Under Esarhaddon, the son of Sennacherib, and his famous son Ashur-bani-pal—a name that means "Ashur creates a son"—the two great nations of Egypt and Assyria came to very close quarters, for the Delta was conquered by the Assyrians, and the terrors of war were carried far up the fertile Nile valley. There is a piteous picture of the destruction of the crops, and the misery of the people, and the plundering of cities and temples among the annals of the conquerors. Ashur-bani-pal was the strongest of all these strong kings, and many stories of his riches and greatness lingered through the centuries, much mixed up, as we know now, with legend and fable.

THE POWER AND POMP OF THE CONQUERING KING OF MULTITUDES

It is amazing to think of the power in the hands of this one man, as he stands there in his gorgeous clothing, his dazzling ornaments and embroideries and rosettes. He was king over multitudes—not only over his own people and race in the valley of the two rivers, in their immense cities and fertile fields, but also of the nations round, from the Sea of the Rising to the Sea of the Setting Sun—from the Persian Gulf to the Mediterranean.

He lived through many years of campaigns, in which were conquests, as shown on the pictured slabs, full of cruelties one cannot bear to look at. The campaigns against the Elamites are among the most vivid of the battle-pieces, when Te-umman, the king who had dared to rebel, was slain with his sons, and the mass of the army perished by the sword, by torture, and by drowning.

Among the proud accounts Ashur-bani-pal gives of the successes against the Elamites there is the statement, "With the cut-off head of Te-umman, the road to Arbela I took with joy." On the only slab among the Assyrian sculptures which gives a picture of quiet home life, Ashur-bani-pal and his queen are shown feasting in a garden and the cut-off head of Te-umman hangs on a tree just above them.

Ashur-ban-pal passed much of his time, when he was not killing men, in killing animals, and the slabs from his palaces that show him hunting lions, wild asses, and goats are in the finest and freest style of Assyrian art.

Pain terror, fury, are all shown in lifelike reality, evidently studied from nature, as the king s arrows and spears carry death in the hunting-grounds.

ONE OF THE MOST WONDERFUL LIBRARIES THAT THE WORLD HAS EVER SEEN

But Ashur-bani-pal not only carried on the traditions of his family in warlike prowess and in successful daring in the hunting-field; he was a great book collector, like his grandfather, Sennacherib, and his great-grandfather, Sargon. Like them, too, he sought for copies of the old Babylonian books in the libraries and temples of the ancient cities, and set scribes to work copying, repairing, translating, arranging, and cataloguing, as well as writing new annals, till the library in his palace became one of the most wonderful the world has ever seen.

There are some thousands of these books in the British Museum alone, and many have labels beside them giving an account of their contents. So let us now spend a little while in that most delightful of all occupations, wandering round a library, dipping into new books—new to us, though the hands that wrote them, and the eyes that first read them, have been turned to dust for long centuries.

HOW THE KING OF HOSTS WROTE HIS NAME IN HIS BOOKS

Ashur-bani-pal wrote his name and address in his books in rather a lengthy and vainglorious form, but it is very interesting. "The palace of Ashur-bani-pal, king of hosts, king of Assyria, who putteth his trust in the gods Ashur and Bêlit, and who has eyes which see. and ears which hear. I have written upon tablets the noble products of the work of the scribe, which none of the kings who had gone before me had learned. I have arranged them in classes, I have

revised them and placed them in my palace that I, even I, the ruler who knoweth the light of Ashur, the king of the gods, may read them. Whosoever shall carry off this tablet, or write his name upon it side by side with mine own, may Ashur and Bêlit overthrow him in wrath and anger, and may they destroy his name and posterity in the land."

It is the creation tablets in this royal library of Nineveh that arouse the greatest interest. It is believed that they are copies of much more ancient ones from the kingdom of Babylonia. The familiar visions of the opening chapters of the book of Genesis rise before us as we read in these other old books of beginnings of the time when the heavens were not and the earth was not.

Familiar, too, do the words seem which describe the creation of the planets and stars, and of the moon to determine the days, followed by the account of the filling of the earth with beasts and cattle, and birds and creeping things. How well known to us seems the teaching of the god Marduk to the man who is the crowning work of his marvelous creation.

"Thy heart shall be pure before thy god, for that is due to him. Thou shalt pray, and shalt make supplications and bow low to the earth early in the morning."

Of surpassing interest, too, are the tablets bearing what has been called the oldest fairy story in the world, the wanderings and adventures of the great hero Gilgamesh. We catch bewildering glimpses of prowess like that of Hercules, the hero of the Mediterranean, of dazzling experiences like those of Sindbad the Sailor, for Gilgamesh fought unequal battles with monsters, and was helped by a sailor, and saw trees laden with precious stones instead of fruit.

In the course of his wanderings he heard the story of the Flood from the Babylonian Noah, and how he built a ship and saved himself and his family and some animals, and how all the rest of living creatures were drowned in the storm of rain and wind. He heard, too, of the flight of the dove from the ark,

THREE KINGS OF ASSYRIA, CARVED IN STONE THOUSANDS OF YEARS AGO

On the left is Esarhaddon, the son of the Sennacherib mentioned in the Bible; in the middle, Ashur-bani-pal, his son, perhaps the most powerful and cruel of the Assyrian monarchs; and on the right is Ashur-nazir-pal, who lived about the time of Jeroboam, King of Israel. He was a great conqueror, boaster, and builder.

followed by a swallow and a raven, and the reappearance of dry land and the repeopling of the earth. But we must pass on to the grammar books, and those giving lists of signs and their meanings; more than 300 signs are in common use in the tablets, out of nearly 600 which the Assyrian language then contained. What earnest eyes must have pored over the tablets ruled in columns which show the differences in the two old languages, Sumerian and Akkadian, and over other tablets which translate these into Assyrian, with all kinds of exercises and examples, and even proverbs and riddles.

The history section of the royal library is very full, for the kings loved not only to record their doings and conquests, but to hunt up ancient inscriptions on cylinders and tablets, and to set forth dates and names of kings, with particulars of their buildings and wars, copied from various old chronicles. As we read, we realize the great stretch of centuries that goes back to the old Babylonian times, and we learn of the constant disputes about the boundaries of the two kingdoms of Babylonia and Assyria.

A KING'S LETTERS TO HIS BROTHER 2,500 YEARS AGO

Of the particulars of the building of temples and palaces there is no lack, and the records of Ashur-bani-pal's own history are endless. We can see letters to him from his twin-brother, whom he made Governor of Babylon; out of this grew a tragedy, for his brother rebelled and failed, and perished miserably in the flames of his palace. It was useless to plead for pardon with Ashur-bani-pal.

There is, indeed, no end to the varied interests of the tablets, and the study of them takes us into the very heart of life in Assyria during the times of its most powerful kings. For, besides all the old legends, and the language and history teaching, there are many hymns and prayers to the gods, showing the religious feeling of those far-off days, and countless letters on private and business matters showing the relations between man and man.

And, beside these tablets, we find others giving directions for making the images of the gods, for their transport, for supplying crowns for their heads, and furniture for their idolatrous worship. With regard to the business letters, the sales of slaves, houses, land, and crops, the loans and repayments, all show that life was carried on in and around Nineveh under much the same conditions as in the old mother city and country of Babylon centuries before.

THE DESOLATION THAT CAME TO THE MIGHTY CITY OF THE GREAT KING

As we pore over the living story of the long-dead past, we notice how many of the tablets are cracked and broken, how many show marks of fire. For there came a day—only about thirty years after Ashur-bani-pal's death—when the quiet library was deserted, and scribes and students no longer passed careful hands along the narrow shelves on which the tablets were arranged, with a well-kept system of catalogues and labels, each class of literature by itself.

For the high tide of Assyrian power had begun to turn even before Ashur-bani-pal's death. Weak kings followed him, and the great nation of the Medes on the eastern borders defeated the hitherto invincible Assyrians, and were only held off from the capital by the sudden rush across Western Asia of the savage hordes of the Scythians, who destroyed everything that came in their way.

But the end was drawing near; and when the Medes joined with Nabopolassar, an Assyrian general commanding in Babylonia, the city of Nineveh, that great city of palaces and temples and books, was taken and destroyed by fire after a siege of two years. That was how the wooden shelves and fittings of the royal library were burned, and the tablets fell in heaps in the ruins, broken and scorched. This was about 600 years before Christ, over 2,500 years ago.

THE DEAD HEART OF A PROUD EMPIRE THAT HAS UTTERLY PERISHED

The destruction of the city meant death or slavery for those who had made their homes in it, and to the empty, desolate ruins came no fresh settlers. Slowly the stone slabs and monuments became covered with mud, as the soft sun-dried bricks turned back to clay and earth, and the heavy rains and strong winds did their share in leveling and rounding the mounds, and in bringing vegetation to cover the grave of a city once full of life and toil, luxury and poverty.

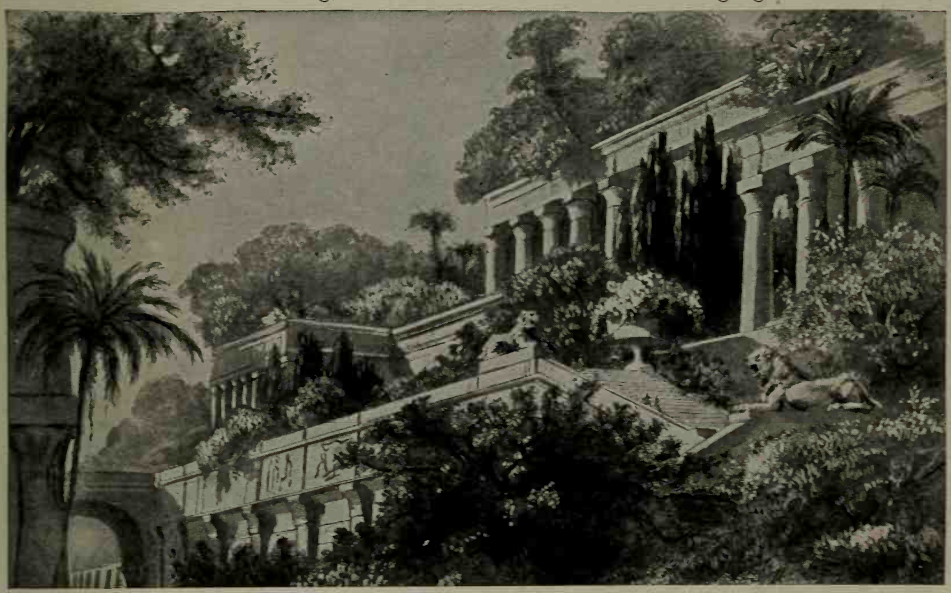
And not only Nineveh, but one by one, in like manner, the rest of the cities

of Assyria died and were buried, and in time forgotten. For the northern kingdom itself, independent for over a thousand years, passed on the fall of its capital under the power of the Medes, and the tributary states, fought for with such energy and cruelty, all fell apart.

Nabopolassar took Babylonia for his share, and founded the new Babylonian Empire, which lasted scarcely a hundred years. Those years are, however, full of events. Nabopolassar's son was Nebuchadnezzar II., already known to us in the story of Daniel's youth. It was this Nebuchadnezzar who took Jerusalem, seized and blinded the king, and completed the carrying into captivity of the Jews. The stories of Daniel and of the three young Hebrews who were thrown into the fiery furnace for refusing to worship the golden image that Nebuchadnezzar set up have always been favorites. We have often imagined the noisy scene on the plain of Dura—the shouting crowds, the jangling sound of the musical instruments, as well as the intense glow of heat from the great fire.

Nebuchadnezzar ever showed great zeal for the honor of the gods, and one of his most renowned works, that of restoring a very ancient temple to his special god, Nebo, touches with light one of the oldest stories of the world, that of the Tower of Babel. We can see in the cases at the British Museum the glazed tiles of different colors with which Nebuchadnezzar faced each of the seven storeys of his temple.

But even more interesting is his account of the tower of immense height which his building replaced. Its top had been left unfinished by its builders of olden time, so that rains and storms, through the centuries, slowly destroyed the walls and facings, till all sank into a state of ruin. Birs Nimroud, the present name of the mound which covers the ruins of this traditional Tower of Babel, as well as those of its gorgeous successor, is a few miles away from the dead heart of ancient Babylon. We read the marvelous story of Nebuchadnezzar's buildings and undertakings in the great city, larger, it is said, than our huge New York is now. It is all told in the bricks stamped with his name, in the inscriptions on slabs, in cylinders and Bronze doorsteps, and we are filled with amazement and pleasure.



THE HANGING GARDENS OF BABYLON, ONE OF THE WONDERS OF THE WORLD

Formed the greatest marvel in a palace of marvels, which Nebuchadnezzar called "the admiration of mankind." The gardens were laid out on terraces reared upon a series of mighty arches, and are said to have been built by Nebuchadnezzar for his favorite wife, who came to the flat plain of Babylon from a hilly land.

It is not difficult, either, to understand the intense pride of Nebuchadnezzar, walking about his palaces and temples and gardens, and saying: Is not this great Babylon, that I have built for the house of my kingdom, by the might of my power, and for the honor of my

majesty?" Alas! for the sudden and awful madness that overtook him, that of believing that he was no longer a man, but a beast of the field. By no other means, save death, could he have been so stripped in a moment of power, majesty, and all that made life glad. For he went out alone to live in the fields and eat grass.

Daniel, though one of the captive race, acted as regent during the king's illness, having risen high in the state owing to his uprightness and ability. He also lived on through the reign of Nabonidus, who followed Nebuchadnezzar.

From the tablets of these reigns, given particulars of shepherds and gardeners, sales and transfers of land, the making of canals and the care of the embankments, we can see that the prosperous agricultural and trading life went on in the new Babylonian Empire as it had done in the old.

The links between the old and new empires are many and deeply interesting; we may just mention two. There is a weight in one of the cases in the British Museum bearing an inscription stating that it is an exact copy of one made by Nebuchadnezzar, King of Babylon from 604 to 561 before Christ, after the standard fixed by Dungi, King of Babylon, just 2,500 years before. Again Nabonidus was delighted to discover monuments of Burna-buriash, one of the writers of the Tel-el-Amarna tablets, a thousand years before his day; and those of Hammurabi, the great law-giver and canal-builder, who lived nearly a thousand years before Burna-buriash; and those of Sargon I., a thousand years earlier than the great king Hammurabi.

Nabonidus had a son who was called Belshazzar. The very mention of his name rouses us, for who has not heard of the great feast that he gave to a thousand guests, when wine was drunk out of the sacred vessels torn from the Jewish temple? The loud revelry is at its height, when suddenly it is frozen into stillness by the sight of writing mysteriously thrown upon the palace wall. It is only the names of the common weights of the Babylonian market —like our pounds and ounces. What can it mean? While Daniel is being brought to explain it to Belshazzar and his terrified guests, let us look beyond the immense walls, thick and strong enough, the Babylonians believed, to keep any enemies out.

Enemies had been slowly closing in—men who are described as hardy warriors, riding well, speaking the truth, drinking water, not wine, while the careless feasted. These Persians, closely allied to the Medes, had been silently turning aside the course of the river which ran through the city, so that when the moment came they could pass in on its dried-up bed.

The writing was interpreted by Daniel as follows: "God hath numbered thy kingdom, and finished it. Thou art weighed in the balances, and art found wanting. Thy kingdom is divided, and given to the Medes and Persians."

Daniel's words were fulfilled that very night. Belshazzar was killed; but, as we learn from the cylinders, the Persians entered Babylon without fighting, and the fine city was spared tribulation when it passed under their rule.

THE NEXT STORY OF COUNTRIES IS ON PAGE 5145.

This mound, known as Birs Nimroud, is all that remains of the once mighty city of Borsippa, the sister city of Babylon, from which it stood about ten miles. We can see the remains of a great tower that Nebuchadnezzar built in honor of his god, Nebo, on what was supposed to be the site of the Tower of Babel.

THE MADNESS OF KING NEBUCHADNEZZAR

Although by his ability and his military prowess Nebuchadnezzar restored Babylonia to the position of first empire in the world, his mind gave way, and for a time he became as a beast of the field. Thinking he was an animal, he spent his days in his palace grounds and tried to feed upon grass. The prophet Daniel, who tells us of this madness, says: "He was driven from men, and did eat grass as oxen, and his body was wet with the dew of heaven, till his hairs were grown like eagles' feathers and his nails like birds' claws."

LA CHATTE ET LE PERROQUET

This story of the Cat and the Parrot is given in English on page 2916.

MADAME THÉOPHILE était une chatte jaune dont l'écrivain français, Théophile Gautier, nous raconte cette charmante histoire:

Elle avait le ventre blanc, le nez rose et des yeux bleus; on l'appelait Madame Théophile parce qu'elle vivait avec moi en excellents termes, dormait au pied de mon lit, rêvait sur le bras de mon fauteuil tandis que j'écrivais, me suivait au jardin, assistait à mes repas et même, parfois, s'emparait d'un peu de la nourriture que je portais à ma bouche sur ma fourchette.

Un jour, un de mes amis, qui allait s'éloigner pour quelque temps, me confia son perroquet. L'oiseau, se sentant transporté dans un lieu étranger, s'éleva, au moyen de son bec, jusqu'au sommet de son perchoir et là, silencieux et tremblant, il roulait des yeux pleins d'alarme.

Madame Théophile n'avait jamais vu de perroquet, et cette créature étrange lui causait évidemment une surprise immense. Immobile comme un chat d'Égypte momifié, elle contemplait l'oiseau avec un air de méditation profonde, rassemblant toutes les notions d'histoire naturelle qu'elle avait pu acquérir sur les toits, dans la cour et dans le jardin. L'ombre de ses pensées traversait ses yeux clignotants, et j'y pouvais lire, aussi clairement que si elle eut parlé, ce résumé de ses observations:

"Décidément, cette créature étrange ne peut pas être une poule verte!"

Étant arrivée à cette conclusion, la chatte descendit de la table oú elle avait établi son observatoire et alla se tapir dans un coin de la chambre, le ventre á terre, les épaules en avant, la tête basse, le dos courbé—ainsi qu'une adroite panthère guettant des gazelles venues de chez elles pour se désaltérer dans un lac.

Le perroquet suivait ces mouvements avec une anxiété fiévreuse; il hérissait ses plumes, agitait sa chaîne, levait sa patte tremblante et aiguisait son bec sur le rebord de sa mangeoire. L'instinct lui disait qu'un ennemi préparait quelque mauvais coup.

Quant aux yeux de la chatte, fixés sur l'oiseau avec une intensité fascinante, ils disaient, en un langage que le perroquet comprit parfaitement, et qui n'avait rien d'incertain:

"Quoique verte, cette poule doit être bonne à manger."

Je suivais cette scène avec intérêt, prêt à m'interposer si l'occasion le demandait. Madame Théophile s'était rapprochée du perroquet; son nez rose palpitait, elle fermait les yeux á-demi, ouvrait et fermait ses griffes. De petits frissons courait le long de son épine dorsale; comme un gourmand assis devant un poulet truffé, elle se délectait à la pensée du repas succulent et rare qu'elle allait faire. Ce plat étrange, si nouveau pour elle et pourtant si tentant, excitait son appétit.

Soudain, son dos se plia comme un arc tendu, et d'un bond élastique, elle atteignit le pied du perchoir. Le perroquet, comprenant le danger, s'écria tout à coup, d'une voix lente et solennelle:

"As-tu bien déjeuné, Jacquot?"

Cette phrase causa à la chatte une terreur indescriptible et elle bondit en arrière. Une sonnerie de trompettes, un effondrement d'assiettes et de plats, un coup de pistolet à ses oreilles, n'auraient pu lui causer une terreur plus folle. Son visage exprimait clairement sa pensée affolante:

"Ce n'est pas un oiseau; c'est un monsieur. Il parle!"

Le perroquet alors se mit à chanter, avec un grand éclat dans la voix qui était assourdissant, car il avait compris que la frayeur causée par sa parole était son meilleur moyen de défense.

La chatte me lança un rapide regard d'interrogation, et, ma réponse ne la satisfaisant pas, elle s'enterra sous le lit, d'oú il fut impossible de la faire bouger, de toute la journée.

Le lendemain, un peu plus courageuse, Madame Théophile, s'enhardit à faire une autre attaque timide, mais avec le même sort que la fois précédente.

D'à partir de ce moment, elle renonça à la lutte, et considéra l'oiseau vert comme un homme qui devait être traité avec respect.

HOW THE TRAIN WAS SAVED

CONTINUED FROM 4830

IN a wild part of West Virginia there lived a poor old widow in a roughly-made log-hut, situated on the edge of a chasm miles away from any neighbors. The Baltimore and Ohio Railway had its track close by, and ran across a roughly-built wooden bridge over the yawning chasm.

One windy day in March the snows were melting on the mountain heights, and the river that flowed through the gorge was filled with an icy flood of melted snow. As the day lengthened the waters grew noisier, and their ceaseless roar made the old woman and her daughter uneasy. They were reluctant to go to bed at all, but at last did so in fear and trembling.

About midnight a crash awakened them from their sleep. They dressed hurriedly, and clinging to each other, they crept down to the edge of the gorge, and found that the bridge had been carried away.

No sooner had the old woman realized what had happened than the awful thought came to her that the express would be due in half an hour. There was no one, no signal-box, no telegraph, to warn the approaching train of the danger that lay before it.

Was there *nothing* she could do; no way by which she or her daughter could prevent the awful destruction that awaited the coming train? Stop! There was one thing, one thing only—a light! The engineer would see a light, though no shouts would seem more than a faint whisper in the roar of the raging wind. But where was she to get a light? In the hut she had just half a candle, and if she took that on to the line, the rain and wind would put out the light directly. In her poverty she had neither lamp nor lantern, and the winter fires had almost exhausted her pile of sticks gathered in the woods.

Searching anxiously round the little hut, her eyes rested on the old wooden bedstead and two wooden chairs. These were the only things she could burn; they were dry and old, the posts of the bed worm-eaten, and, if sheltered from the wind, they would stand a chance.

There was not a moment to lose if the train was to be saved. With trembling and eager hands the two women chopped and cut at the bedstead until it lay on the floor in pieces; then, carrying these in their arms, they climbed up on to the line, and the two piled up the wood in the middle of the track, some little distance back from the gaping chasm, in the most sheltered spot they could find.

With trembling hands the old woman struck a match and put it to the pile of furniture. To her joy,

this caught on fire; just in time, for as it began to blaze up, the rumble of the distant train became very evident. How eagerly mother and daughter watched that burning pile, hoping and praying that the engineer would see it in time to stop the train. The mother took off the red skirt she wore, tied it to a stick, and hurried up the line, waving it about in the light from the fire, while the daughter flourished a burning post, as shown in the picture on page 4973. Nearer and nearer came the roar of the train; it was rounding the curve; they could see the red light in front of the engine. They redoubled their efforts, and shouted "Stop! Stop!"

Gradually the train slowed down, and came to a stop close to the burning pile. The engineer's keen eyes, accustomed to see far ahead, discovered the dangerous chasm and the empty space where there should have been a bridge, and as his eyes traveled to the burning furniture and the figures of the old woman and her daughter, he recognized the act of courageous sacrifice that had come from a brave heart.

THE MAN WHO THOUGHT OF HIS COMRADES

DURING the construction of the railway between Manchester and Leeds, in England, a number of tunnels had to be bored. Shafts, some of them two hundred feet deep, were sunk from the hill-tops to the tunnels, for purposes of ventilation.

Among the men employed on this work was a laborer, whose duty was at the top of the shafts. He had to raise the tubs filled underground, and return them empty to the other workmen. If any mishap occurred, such as the breaking of a chain or the falling of a piece of loose rock, he had to warn the men below, so that they could retreat out of danger.

One morning, while he was thus engaged at one of the deepest shafts on the line, his foot slipped, and he felt himself falling towards the narrow channel, against whose ragged sides or on whose rocky bottom he knew he must be hurled and killed.

In that terrible moment, however, he did not lose his presence of mind. His first thought was of his comrades. If he cried out for help, the men below would rush out of their shelters to see what was the matter, and even if they succeeded in saving him it would be at the tremendous risk of losing their own lives.

So the man, with a chivalry as great as that of any knight, gave in his usual voice the signal, "Look out below!" And, secure in their retreats, ignorant of what was happening, the workmen below heard the crash as their comrade fell; and in his death, by suppressing the instinct to cry for help, he became the saviour of his fellow-workmen.

A RACE WITH DEATH

IT was the year 1874, and it had been raining torrents for days in the valley of Williamsburg. One spring morning in May the sun shone out of a blue sky over a rain-soaked earth. The rain was over and everybody came out to greet the sunshine. The men went to work in the fields, and the children played on the door-steps, or threw stones in the river, swollen with the rains, which roared onward between its banks. Suddenly everybody paused in their work or play with a nameless horror clutching at their hearts. A dull, murmuring sound was heard among the hills. Then the hush was broken by the clatter of horse's hoofs and the shouts of a man bearing down through the valley on horseback.

On he came with wildly waving arms, and his hoarse shout spread panic through the valley: "The dam has burst! To the hills! To the hills for your lives!" The terror-stricken inhabitants, not pausing to look behind them, fled to the hills. They were not a second too soon, for a brown, curling flood swept roaring down the valley in fearful pursuit of the brave young farmer on horseback. At last Collins Graves drew his panting horse to a standstill on the high ground at the foot of the valley. His fearful race with death was over. He had saved the people.

THE NEXT GOLDEN DEEDS ARE ON PAGE 5023.

A POEM FOR CHRISTMAS

THERE are many stories told about the birth and boyhood of Jesus for which we find no authority in the Holy Scriptures. That is to say, they are to be regarded, like many of the most beautiful stories in the world, as legends. Here, in this fine poem, Henry W. Longfellow tells a beautiful story of the homage paid to the infant Jesus, and, though largely based on the Scriptural version, it is still in some ways legendary. We are told in the New Testament that certain "wise men" from the East came to Jerusalem, having seen in the heavens a bright star, which they supposed heralded the birth of the King of the Jews, foretold by the prophets of old. Instructed by the Jewish priests, they journeyed down to Bethlehem, and there, in the house where Mary and her husband Joseph lived, they did homage to the infant Jesus, making offerings of gold, and frankincense, and myrrh. To some extent, therefore, Longfellow's poem is based on the Bible story.

THE THREE KINGS

CONTINUED FROM 4902

THREE Kings came riding from far away,
Melchior and Gaspar and Baltasar;
Three Wise Men out of the East were they,
And they travelled by night and they slept by day,
For their guide was a beautiful, wonderful star.

The star was so beautiful, large, and clear,
That all the other stars of the sky
Became a white mist in the atmosphere,
And by this they knew that the coming was near
Of the Prince foretold in the prophecy.

Three caskets they bore on their saddle-bows,
Three caskets of gold with golden keys;
Their robes were of crimson silk with rows
Of bells and pomegranates and furbelows,
Their turbans like blossoming almond-trees.

And so the Three Kings rode into the West,
Through the dusk of night over hill and dell,
And sometimes they nodded with beard on breast,
And sometimes talked, as they paused to rest,
With the people they met at some way-side well.

"Of the Child that is born," said Baltasar,
"Good people, I pray you, tell us the news;
For we in the East have seen His star,
And have ridden fast, and have ridden far,
To find and worship the King of the Jews."

And the people answered: "You ask in vain;
We know of no King but Herod the Great!"
They thought the Wise Men were men insane,
As they spurred their horses across the plain,
Like riders in haste, and who cannot wait.

And when they came to Jerusalem,
Herod the Great, who had heard this thing,
Sent for the Wise Men and questioned them;
And said: "Go down unto Bethlehem,
And bring me tidings of this new King."

So they rode away; and the star stood still,
The only one in the grey of morn;
Yes, it stopped—it stood still of its own free will,
Right over Bethlehem on the hill,
The city of David, where Christ was born.

And the Three Kings rode through the gate and the guard,
Through the silent street, till their horses turned
And neighed as they entered the great inn-yard;
But the windows were closed and the doors were barred,
And only a light in the stable burned.

And cradled there in the scented hay,
In the air made sweet by the breath of kine,
The little Child in the manger lay,
The Child that would be King one day
Of a kingdom not human but divine.

His mother, Mary of Nazareth,
Sat watching beside His place of rest,
Watching the even flow of His breath,
For the joy of life and the terror of death
Were mingled together in her breast.

They laid their offerings at His feet;
The gold was their tribute to a King,
The frankincense, with its odour sweet,
Was for the Priest, the Paraclete,
The myrrh for the body's burying.

And the mother wondered and bowed her head,
And sat as still as a statue of stone;
Her heart was troubled yet comforted,
Remembering what the angel had said
Of an endless reign, and of David's throne.

Then the Kings rode out of the city gate,
With a clatter of hoofs in proud array;
But they went not back to Herod the Great,
For they knew his malice and feared his hate,
And returned to their homes by another way.

THE FIRST NOWELL

As we have already given a very careful selection of Christmas hymns and carols on pages 2187 to 2195, there are not many more to choose. This quaint old carol, however, is worth adding to our collection, as it is one still remembered and sung, though not so commonly as others we have given. "Nowell" is an old way of spelling Noël, which is the French word for Christmas. How comes it that this word appears in a carol written in English? That is easily explained, for, as we know, the Anglo-Saxon speech, after England was conquered by the Normans, adopted numerous words from the Norman-French, and in the old English poetry we find many of these words. This carol, of course, is only poetry in a very crude state, and represents an effort of uneducated people in the olden times to express in their own simple way an old, old story that has touched the hearts of all mankind. It is the same story that Longfellow tells in true poetic form in "The Three Kings."

THE first Nowell the Angel did say,
Was to certain poor shepherds in fields as they lay;
In fields where they lay keeping their sheep,
On a cold winter's night that was so deep.
Nowell, Nowell, Nowell, Nowell,
Born is the King of Israel.

They looked up and saw a star,
Shining in the East beyond them afar;
And to the earth it gave great light,
And so it continued both day and night.

And by the light of that same star,
Three Wise Men came from country afar;
To seek for a King was their intent,
And to follow the star wherever it went.

The star drew nigh to the North-West,
O'er Bethlehem it took its rest;
And there it did both stop and stay,
Right over the place where Jesus lay.

Then did they know assuredly
Within that house the King did lie;
One enter'd in then for to see
And found the Babe in poverty.

Then enter'd in those Wise Men three
Most reverently upon their knee,
And offer'd there in His presence
Both gold, and myrrh, and frankincense.

Between an ox-stall and an ass
This Child, truly there, born He was;
For want of clothing they did Him lay
All in the manger among the hay.

Then let us all with one accord
Sing praises to our heavenly Lord,
That hath made heaven and earth of nought,
And with His blood mankind hath bought.

A CHRISTMAS HYMN

This spirited Christmas hymn by Alfred Domett contrives to give a new turn to an old theme. Though the story of Christmas is a story that changed for ever the whole course of human life and thrilled the world with a new hope, so that there is a sense in which it will never grow old, it has been sung by countless poets, and he may be regarded as something of a genius who can bring a new thought to it.

IT was the calm and silent night!
Seven hundred years and fifty-three
Had Rome been growing up to might
And now was queen of land and sea.
No sound was heard of clashing wars—
Peace brooded o'er the hush'd domain:
Apollo, Pallas, Jove and Mars
Held undisturb'd their ancient reign,
In the solemn midnight,
Centuries ago.

'Twas in the calm and silent night!
The senator of haughty Rome,
Impatient, urged his chariot's flight,
From lordly revel rolling home;
Triumphal arches, gleaming, swell
His breast with thoughts of boundless sway;
What reck'd the Roman what befell
A paltry province far away,
In the solemn midnight,
Centuries ago?

Within that province far away
Went plodding home a weary boor;
A streak of light before him lay,
Fallen through a half-shut stable-door
Across his path He pass'd—for naught
Told what was going on within;
How keen the stars, his only thought—
The air how calm, and cold, and thin,
In the solemn midnight,
Centuries ago!

O strange indifference! low and high
Drowsed over common joys and cares;
The earth was still— but knew not why
The world was listening, unawares.
How calm a moment may precede
One that shall thrill the world for ever!
To that still moment none would heed,
Man's doom was link'd no more to sever—
In the solemn midnight,
Centuries ago!

It is the calm and solemn night!
A thousand bells ring out, and throw
Their joyous peals abroad, and smite
The darkness—charm'd and holy now!
The night that erst no shame had worn,
To it a happy name is given;
For in that stable lay, new-born,
The peaceful Prince of earth and heaven,
In the solemn midnight,
Centuries ago!

MY PLAYMATE

A subdued note of melancholy tunes this poem by J. G. Whittier. It is the reverie of one who, in later life, revisits a scene made dear to him by memories of a little playmate of his early years. Time has worked great changes and taken the playmates far apart, but the old place they knew in youth is still hallowed to the one who lingers there, and has power to touch his memory with many tender thoughts.

THE pines were dark on Ramoth hill,
Their song was soft and low;
The blossoms in the sweet May wind
Were falling like the snow.

The blossoms drifted at our feet,
The orchard birds sang clear;
The sweetest and the saddest day
It seemed of all the year.

For, more to me than birds or flowers,
My playmate left her home,
And took with her the laughing spring,
The music and the bloom.

She kissed the lips of kith and kin,
She laid her hand in mine;
What more could ask the bashful boy
Who fed her father's kine?

She left us in the bloom of May:
The constant years told o'er
Their seasons with as sweet May morns,
But she came back no more.

I walk, with noiseless feet, the round
Of uneventful years;
Still o'er and o'er I sow the spring
And reap the autumn ears.

She lives where all the golden year
  Her summer roses blow;
The dusky children of the sun
  Before her come and go.

There haply with her jewelled hands
  She smooths her silken gown—
No more the homespun lap wherein
  I shook the walnuts down.

The wild grapes wait us by the brook,
  The brown nuts on the hill;
And still the May-day flowers make sweet
  The woods of Follymill.

The lilies blossom in the pond,
  The bird builds in the tree,
The dark pines sing on Ramoth hill
  The slow song of the sea.

I wonder if she thinks of them,
  And how the old time seems—
If ever the pines of Ramoth wood
  Are sounding in her dreams.

I see her face, I hear her voice:
  Does she remember mine?
And what to her is now the boy
  Who fed her father's kine?

What cares she that the orioles build
  For other eyes than ours—
That other hands with nuts are filled,
  And other laps with flowers.

O playmate in the golden time!
  Our mossy seat is green,
Its fringing violets blossom yet,
  The old trees o'er it lean.

The winds so sweet with birch and fern
  A sweeter memory blow;
And there in spring the veeries sing
  The song of long ago.

And still the pines of Ramoth wood
  Are moaning like the sea—
The moaning of the sea of change
  Between myself and thee!

I TRAVELLED AMONG UNKNOWN MEN

Wordsworth was curiously fond of the name Lucy, which occurs in quite a number of his shorter lyrics. In this beautiful little poem he touches a theme that has often inspired writers of all kinds. It is only when we travel "among unknown men" in foreign lands that we realize how dear is our homeland. Lucy here is really the cherished object of our affections made individual. The poem was composed by Wordsworth in the year 1799, and was one of the "Poems Founded on the Affections," published in 1907.

I TRAVELLED among unknown men,
  In lands beyond the sea;
Nor, England! did I know till then
  What love I bore to thee.

'Tis past, that melancholy dream!
  Nor will I quit thy shore
A second time; for still I seem
  To love thee more and more.

Among the mountains did I feel
  The joy of my desire;
And she I cherished turned her wheel
  Beside an English fire.

Thy mornings show'd, thy nights conceal'd
  The bowers where Lucy play'd:
And thine is, too, the last green field
  That Lucy's eye survey'd.

THREE YEARS SHE GREW

In this very familiar poem of Wordsworth's we have yet another instance of his love for the name of Lucy. We are not to suppose that the poet is here expressing a personal experience. Indeed, this particular poem was composed in 1799, and was published in 1800 among his "Poems of the Imagination," so that we may regard it as purely imaginative, but none the less essentially real in its spiritual truth.

THREE years she grew in sun and shower;
  Then Nature said: "A lovelier flower
  On earth was never sown.
This child I to myself will take;
She shall be mine, and I will make
  A lady of my own.

"Myself will to my darling be
Both law and impulse, and with me
  The girl, in rock and plain,
In earth and heaven, in glade and bower
Shall feel an overseeing power
  To kindle or restrain.

"She shall be sportive as the fawn
That, wild with glee, across the lawn
  Or up the mountain springs;
And hers shall be the breathing balm,
And hers the silence and the calm
  Of mute, insensate things.

"The floating clouds their state shall lend
To her; for her the willow bend
  Nor shall she fail to see
Even in the motions of the storm
Grace that shall mould the maiden's form
  By silent sympathy.

"The stars of midnight shall be dear
To her; and she shall lean her ear
  In many a secret place,
Where rivulets dance their wayward round,
And beauty born of murmuring sound
  Shall pass into her face.

"And vital feelings of delight
Shall rear her form to stately height,
  Her virgin bosom swell;
Such thoughts to Lucy I will give
While she and I together live
  Here in this happy dell."

Thus Nature spake; the work was done—
How soon my Lucy's race was run!
  She died, and left to me
This heath, this calm and quiet scene;
The memory of what has been,
  And never more will be.

THE TIDE RISES, THE TIDE FALLS

Longfellow here gives a fine example of contrast, and the poetic effect obtained by its proper use. Quietly he pictures the ebb and flow of the tide, suggestive of the ceaseless motion of Nature, and suddenly he shows us the frailty of human life in contrast with the mighty force of Nature.

THE tide rises, the tide falls,
  The twilight darkens, the curlew calls;
  Along the sea-sands damp and brown
  The traveller hastens toward the town.
And the tide rises, the tide falls.

Darkness settles on roofs and walls,
But the sea in the darkness calls and calls;
  The little waves, with their soft white hands,
  Efface the footprints in the sands,
And the tide rises, the tide falls.

The morning breaks; the steeds in their stalls
Stamp and neigh, as their hostler calls;
  The day returns, but nevermore
  Returns the traveller to the shore,
And the tide rises, the tide falls.

A DAISY AT CHRISTMAS

James Montgomery, who wrote these charming verses on the daisy, after finding one in bloom on a Christmas Day, was a poet of some note in the first half of last century. He was born in Scotland in 1771, but lived most of his life in England, being the editor of a journal at Sheffield, where he died in 1854.

THERE is a flower, a little flower,
With silver crest and golden eye,
That welcomes every changing hour
And weathers every sky.

The prouder beauties of the field
In gay but quick succession shine;
Race after race their honours yield,
They flourish and decline.

But this small flower, to Nature dear,
While moon and stars their courses run,
Enwreathes the circle of the year,
Companion of the sun.

It smiles upon the lap of May,
To sultry August spreads its charm,
Lights pale October on his way,
And twines December's arm.

The purple heath and golden broom,
On moory mountains catch the gale,
O'er lawns the lily sheds perfume,
The violet in the vale.

But this bold floweret climbs the hill,
Hides in the forest, haunts the glen,
Plays on the margin of the rill,
Peeps round the fox's den.

Within the garden's cultured round
It shares the sweet carnation's bed;
And blooms on consecrated ground
In honour of the dead.

The lambkin crops its crimson gem;
The wild bee murmurs on its breast;
The blue fly bends its pensile stem
Light o'er the skylark's nest.

'Tis Flora's page—in every place,
In every season, fresh and fair,
It opens with perennial grace,
And blossoms everywhere.

On waste and woodland, rock and plain,
The humble buds unheeded rise;
The rose has but a summer reign;
The daisy never dies!

THE DAY IS DONE

Few of the shorter poems written by Longfellow are more deservedly popular than the following, which has hardly a verse that does not contain some rare beauty of poetic thought and expression. The longing for quiet and peace at the end of a day of strenuous toil has never been better conveyed in poetic form, and the pure pleasures of a good man's domestic life are here celebrated in the worthiest verse. The last stanza of the poem is a favorite quotation.

THE day is done, and the darkness
Falls from the wings of Night,
As a feather is wafted downward
From an eagle in his flight.

I see the lights of the village
Gleam through the rain and the mist,
And a feeling of sadness comes o'er me
That my soul cannot resist:

A feeling of sadness and longing,
That is not akin to pain,
And resembles sorrow only
As the mist resembles the rain.

Come, read to me some poem,
Some simple and heart-felt lay,
That shall soothe this restless feeling,
And banish the thoughts of day.

Not from the grand old masters,
Not from the bards sublime,
Whose distant footsteps echo
Through the corridors of Time.

For, like strains of martial music,
Their mighty thoughts suggest
Life's endless toil and endeavour;
And to-night I long for rest.

Read from some humbler poet,
Whose songs gushed from his heart,
As showers from the clouds of summer,
Or tears from the eyelids start;

Who, through long days of labour
And nights devoid of ease,
Still heard in his soul the music
Of wonderful melodies.

Such songs have power to quiet
The restless pulse of care,
And come like the benediction
That follows after prayer.

Then read from the treasured volume
The poem of thy choice,
And lend to the rhyme of the poet
The beauty of thy voice.

And the night shall be filled with music,
And the cares that infest the day
Shall fold their tents, like the Arabs,
And as silently steal away.

ALADDIN

James Russell Lowell, a famous American poet, puts a great deal of thought into these sixteen lines. Quite a long essay, almost a book, might be written to show that the beautiful dreams of youth are worth far more than all the gold one has gathered in old age. But nothing more could be said than is here conveyed, and that is the glory of the poet.

WHEN I was a beggarly boy,
And lived in a cellar damp,
I had not a friend nor a toy,
But I had Aladdin's lamp;
When I could not sleep for cold,
I had fire enough in my brain,
And builded, with roofs of gold,
My beautiful castles in Spain!

Since then I have toiled day and night,
I have money and power good store;
But I'd give all my lamps of silver bright,
For the one that is mine no more;
Take, Fortune, whatever you choose—
You gave, and may snatch again;
I have nothing 'twould pain me to lose,
For I own no more castles in Spain!

A SIGH*

IT was nothing but a rose I gave her,—
Nothing but a rose
Any wind might rob of half its savour,
Any wind that blows.

When she took it from my trembling fingers
With a hand as chill,—
Ah, the flying touch upon them lingers,
Stays, and thrills them still!

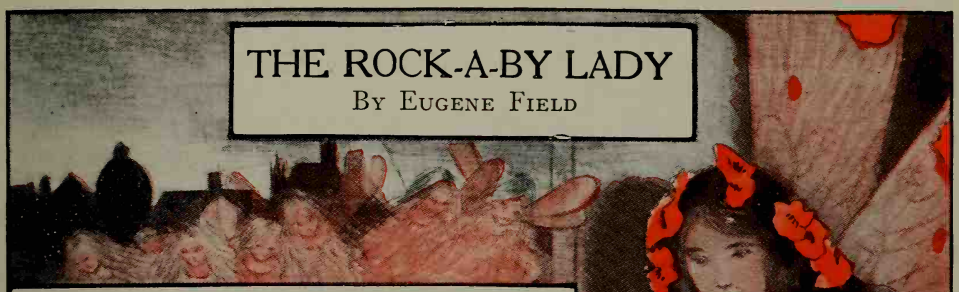
Withered, faded, pressed between the pages,
Crumpled fold on fold,
Once it lay upon her breast, and ages
Cannot make it old!

HARRIET PRESCOTT SPOFFORD.

*From Poems by Harriet Prescott Spofford, copyright, 1881, by Houghton, Mifflin & Company.

THE ROCK-A-BY LADY

By Eugene Field



The Rock-a-by Lady from Hush-a-by Street
Comes stealing, comes creeping;
The poppies they hang from her head to her feet,
And each hath a dream that is tiny and fleet;
She bringeth her poppies to you, my sweet,
When she findeth you sleeping!

There is one little dream of the beautiful drum—
"Rub-a-dub!" it goeth;
There is one little dream of a big sugar-plum,
And lo! thick and fast the other dreams come
Of popguns that bang, and tin tops that hum,
And the trumpet that bloweth!

And dollies peep out of those wee little dreams
With laughter and singing;
And boats go a-floating on silvery streams,
And the stars peek-a-boo with their own misty gleams,
And up, up, and up, where the Mother Moon beams,
The fairies go winging!

Would you dream all these dreams that are tiny and fleet?
They'll come to you sleeping;
So shut the two eyes that are weary, my sweet,
For the Rock-a-by Lady from Hush-a-by Street,
With poppies that hang from her head to her feet,
Comes stealing, comes creeping.

From "Love Songs of Childhood," copyright, 1894, by Eugene Field, published by Charles Scribner's Sons.

LITTLE VERSES FOR VERY LITTLE PEOPLE

CHRISTMAS is coming, the geese are
getting fat,
Please put a penny in an old man's
hat;
If you haven't got a penny, a ha'penny
will do,
If you haven't got a ha'penny, God
bless you.

A BUTTERFLY perched on a mossy
brown stile,
And a little maid saw him and cried
with a smile:
"O beautiful butterfly, yellow and blue,
Stop, stop, let me sit on the stile with
you!"
But the beautiful butterfly, yellow and
blue,
Opened his wings and away he flew;
And when he'll return I really can't say,
But the little maid sits on the stile to
this day!

A KISS when I wake in the morning,
A kiss when I go to bed,
A kiss when I burn my fingers,
A kiss when I bump my head.

A kiss when my bath is over,
A kiss when my bath begins;
My mamma is as full of kisses
As nurse is full of pins.

A kiss when I play with my rattle,
A kiss when I pull her hair;
She covered me over with kisses
The day that I fell downstair.

A kiss when I give her trouble,
A kiss when I give her joy;
There's nothing like mamma's kisses
To her own little baby boy.

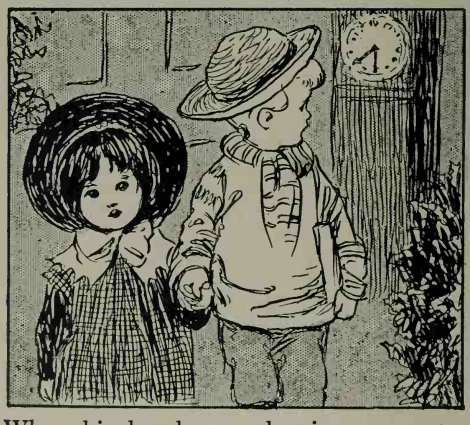
HE was a rat, and she was a rat,
And they chose in a hole to
dwell,
And both were as black as a witch's
cat,
And they loved one another well.

He had a tail, and she had a tail,
Both long and slender and fine;
And each said: "Yours is the finest
tail
In the world, excepting mine."

He smelt the cheese, and she smelt
the cheese,
And they both pronounced it good;
And both remarked it would greatly
add
To the charms of their daily food.

So he ventured out, and she ventured
out,
And I saw them go with pain;
And now what befell them I never can
tell,
For they never came back again.

THE grave old clock on the mantelpiece
Is ticking the hours away;
There's never a smile on his solemn face
Throughout all the merry day.
Tick-tock, tick-tock,
Whatever we do or say.



When his hands are showing a quarter
to nine,
We must hurry to school away;
The clock never scolds nor gives us a
frown,
If we stop a minute to play.
Tick-tock, tick-tock,
Whether we go or stay.

LAVENDER'S BLUE

NURSERY RHYMES OF THE CHILDREN OF FRANCE

The French and English versions of these Rhymes are side by side.

EN passant dans un petit bois,
Où le cou-cou chantait,
Dans son joli chant il disait:
"Cou-cou! cou-cou!
Cou-cou! cou-cou!"

Et moi je croyais qu'il disait:
"Casse-lui le cou!
Casse-lui le cou!"
Et moi de m'en cour', cour', cour',
Et moi de m'en courir.

En passant auprès d'un étang,
Où les canards chantaient,
Dans leur joli chant ils disaient:
"Couin! couin!
Couin! couin!"

Et moi qui croyais qu'ils disaient:
"Jette-le dedans!
Jette-le dedans!"
Et moi de m'en cour', cour', cour',
Et moi de m'en courir.

En passant devant une maison,
Où la bonne femme chantait,
Dans son joli chant elle disait:
"Dodo! dodo!
Dodo! dodo!"

Et moi qui croyais qu'elle disait:
"Casse-lui les os!
Casse-lui les os!"
Et moi de m'en cour', cour', cour',
Et moi de m'en courir.

PASSING through a little wood,
Where the cuckoo's calling,
In his pretty song he says:
"Cuckoo! Cuckoo!
Cuckoo! Cuckoo!

To me it sounds as if he said:
"Break his neck, do!
Break his neck, do!"
And so I run, run, run,
Faster, ever faster.

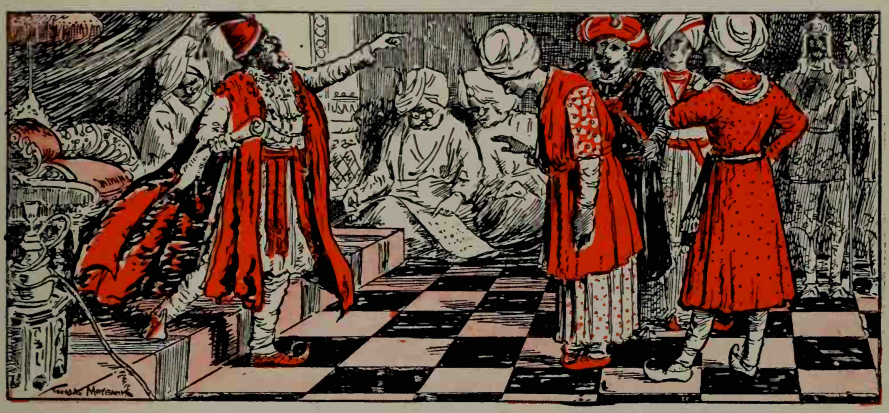
Passing near a fishpond,
Where the ducks are calling,
In their pretty song they say:
"Quack, quack! quack, quack!
Quack, quack! quack, quack!"

To me it sounds as if they said:
"Throw in Master Jack!
Throw in Master Jack!"
And so I run, run, run,
Faster, ever faster.

Passing by a pretty house,
Where the good wife's calling,
In her pretty song she says:
"Patacake! patacake!
Patacake! patacake!"

To me it sounds as if she said:
"His bones I'll break!
His bones I'll break!"
And so I run, run, run,
Faster, ever faster.

Pretty flowers, tell me why
All your leaves do open wide,
Every morning when on high
The noble sun begins to ride?
SYBIL SCOTT PALEY



THE FOUR WISE MINISTERS

CONTINUED FROM 4868

THERE was a certain King of Benares who had four very wise ministers, and when he wanted to put a heavy tax on his people, they advized him not to do so. This made the king very angry, and he stripped the four ministers of all their wealth and honors, and sent them out of the city.

As the four ministers were walking away from Benares, they came to a track recently made by a camel, and began to talk about the animal. They were still talking about it, when a merchant came up to them, and said that he had lost his camel. One of the ministers asked him if it was not lame in one of its legs; another wished to know if it was not blind in the right eye; the third inquired if it had not a very short tail; and the fourth asked if it was not suffering from some stomach trouble.

"Yes," said the merchant eagerly; "you describe it better than I could myself. Where did you see it?"

"We have never seen it," replied one of the ministers. "But there is its track on the road."

"Why, you know it better than myself!" said the merchant angrily. "You must have found it, and sold it. I shall complain to the king."

This he at once did, and the king recalled his four ministers, and threatened to punish and imprison them if they did not confess the truth.

"If you never saw the camel," the king said, "how could you tell if it was lame, or blind, or short-tailed, or suffering from some disease?"

"I noticed it left only three foot-prints," said the first minister, "and I concluded it was lame in one leg."

"And I saw," said the second minister, "that the leaves of trees on the left side of the road had been eaten, while those on the right side were untouched. So it seemed to me that the animal was blind in its right eye."

"Now and then," said the third minister, "there were faint specks of blood in the track of the camel. These appeared to have come from mosquito bites, so the camel must have had a very short tail, and was therefore unable to brush the insects away."

"I observed," said the fourth minister, "that the camel's two fore-feet were pressed firmly into the ground, while the sound hind-foot scarcely touched it. I concluded, therefore, that the hind-legs were drawn up by some pain in the animal's body."

On hearing these explanations, the king was overcome with admiration for the wisdom of his four ministers.

"When four men of your wisdom advized me not to impose a certain tax," he said, "I ought to have followed their advice. The tax shall at once be taken off, and if you will forgive me, and enter my service again, I shall always be guided by your counsel."

THE LITTLE MAN BY THE SECRET SHORE

JOCELINE was very fond of adventures. She was always climbing to the tops of the trees to see what lived there, and when she was a very little girl she ran away twice, right down the road, to find out where it led to.

One day her father and mother took her to stay at the seaside, and after they had been there a little time Joceline noticed that there was one part of the shore they could never reach, because a bit of cliff stuck out such a long way into the sea, and the cliff was so high that one could not possibly get down it.

One morning, when Joceline had awakened very early, she sat up in bed, thinking what a lovely place that secret shore would be for an adventure if only she could find a way through that cliff. After a while she got up and dressed, and then ran out along the road to the shore.

When she had hunted about a good while, she felt so tired that she lay down to rest. And as she lay there, almost asleep, she suddenly saw a tiny black man, dressed like a coal-man, go hurrying through the grass towards a rabbit-hole, into which he disappeared.

Joceline was astonished; she sat up, and was still more excited to notice that the black man had dropped a piece of the biscuit he had been eating. She was so hungry that she picked it up and ate it, and suddenly found herself rapidly growing smaller and smaller, till she was just a little smaller than the black man. She could now enter the rabbit-hole quite easily; so on she ran, for this seemed to her a lovely adventure. The rabbit-hole sloped down to a dark passage, and, as she ran, her heart went bump, bump, bump, for she thought the rabbit-hole must lead to the secret shore.

And so it did. When first Joceline reached the shore, she had to blink her eyes quite hard, for, instead of ordinary stones on the beach, there were diamonds and pearls, and rubies and emeralds, and other precious stones. How beautiful they were! But the worst of it was, she was so tired and hungry that she couldn't enjoy the sight of the pretty stones at all. She put just a few in her pockets and determined to go straight home. But when she tried to find the rabbit-hole through which she had entered, she could not see it anywhere. So she kept on tumbling over the great stones, and getting more cross, hungry, and tired every minute. At last she saw that she had come quite close to the little black man, who was busy filling a sack with precious stones.

Joceline gave a little cough, and then said very politely: "Please, could you tell me the way out?"

The black man gave a regular jump, and turned around very cross indeed.

"How did you ever find your way here?" he shouted. "And after all the trouble I've taken to keep you horrid little fairies out! You bothering, interfering monkey! As if you hadn't got enough pretty things of your own without coming to steal mine!"

"If you please," replied Joceline in a frightened voice, "I don't want your pretty stones. I only want my breakfast. I'm so dreadfully hungry." And she started to cry.

The black man looked at her for a minute, and then he made a grimace.

"You are not a fairy," he said. "You are only a silly little human girl. But I didn't know they made them that size."

He seemed so pleased to find she was not really a mischievous fairy—for, of course, fairies can't cry—that he became very good-natured.

"Want some breakfast, do you?" he asked. "Oh, well, that's easy enough!" And he took a little black stick out of his pocket and waved it a few times in the air, and—what do you think?—all the stones near Joceline turned into mince pies, jam tarts, biscuits and little cakes!

So Joceline sat down, and began eating away as hard as she could, and the black man turned his back on her and went on stuffing his sack full of stones. When she had eaten as much as she could, she got up and gave another little cough.

"If you please," she said quietly, "I've had enough to eat, and thank you very, very much. And now, please, could you show me the way home?"

The black man turned quickly round. "You're a very pleasant-mannered little

girl," he said; "and I daresay you think I'm a very ill-tempered man. But it's all those fairies. I have taken no end of trouble to hide the way by which I get here, and yet they continually come and steal my stones. That's why I'm taking all the stones away."

"Where will you hide them?" asked Joceline very timidly.

The black man looked at Joceline.

"Ha!" was all he said.

So then Joceline knew it was a secret. Just at that moment she remembered the stones she had put in her pocket.

"Why," she said, "I'm as bad as the fairies! I've been stealing your stones, too. I beg your pardon." And she pulled out a diamond, and a pearl, and a ruby that she had picked up.

But the black man told her she might keep them if she promised never to tell where she had found them.

Joceline promised, and then asked him again how she was to find her way home.

"Come on," he said, and, picking up his sack of stones, he led her along to a hole in the cliff.

"Now lie down and shut your eyes," said the black man, "and before you can say Jack Robinson you will find yourself back in your little bed."

Joceline did as she was told; and immediately she closed her eyes she found that she began to feel sleepy—then sleepier and sleepier.

When she woke up, she found herself in her own little bed.

"Why, it must have been a dream!" she said. But to make quite sure she crept out of bed, and felt in the pocket of her dress. Yes, there was something hard inside; and she felt so excited.

She pulled it out—a diamond, such a beauty! She put her hand in again—a pearl, as big as an egg! She put her hand in a third time—a ruby, as big as an apple! She *was* glad.

When she went down to breakfast she showed her mother and father her wonderful treasures. They couldn't believe their eyes when they saw the gems.

But when they asked her where she had got them, she suddenly remembered her promise, and she said: "I promised faithfully I wouldn't tell."

"Quite right, Joceline," said her mother, for she liked Joceline always to keep her promises, and she could see the stones were fairy stones. And Joceline really never told anybody.

Her father sold the shiny stones for her, and received such a lot of money for them that, when she grew up, Joceline bought a lovely house and garden, and got all the poor, ragged, hungry little children she could find in the streets, and made them come and live with her.

AS JOCELINE LAY THERE, SHE SAW A TINY BLACK MAN HURRYING THROUGH THE GRASS

A CLEVER BAD MAN

THE STRANGE TALE OF VIDOCQ, THE FRENCH DETECTIVE, WHO ASTONISHED THE WORLD, AND LEFT A NAME THAT WILL NEVER BE FORGOTTEN

TOWARDS the end of the eighteenth century, a baker, living in the French town of Arras had a son born to him who was destined to astonish the world, and leave behind him an almost imperishable name.

The baker's name was Vidocq, and he appears to have been a hard father, but very industrious and honest. By the time that little Vidocq was eight years of age, the father's strap was in daily use. Whether he might have made something good out of his son by kindness and wise advice we cannot tell; all we know is that the little Vidocq was a bad boy, that his father constantly beat him, and that he grew steadily worse.

When he was sent out with a basket of loaves, he often stopped to talk to the thieves and low characters in the town, and was proud to be their friend.

He learned from these scoundrels how to steal money out of shop tills with a feather which had glue at the end. He robbed fowl-houses. He stole everything he could lay hands upon, and sold the articles in pawnshops. In vain his father flogged him. The boy appeared incurably bad, and he was sent to prison. This experience did not cure him, however, and directly he was set free he stole the money-box of his own father and ran away.

After varied experiences with showmen, menageries, Punch-and-Judy exhibitions, Vidocq returned home, famished and miserable, to be welcomed with tears by the poor mother who loved and adored him.

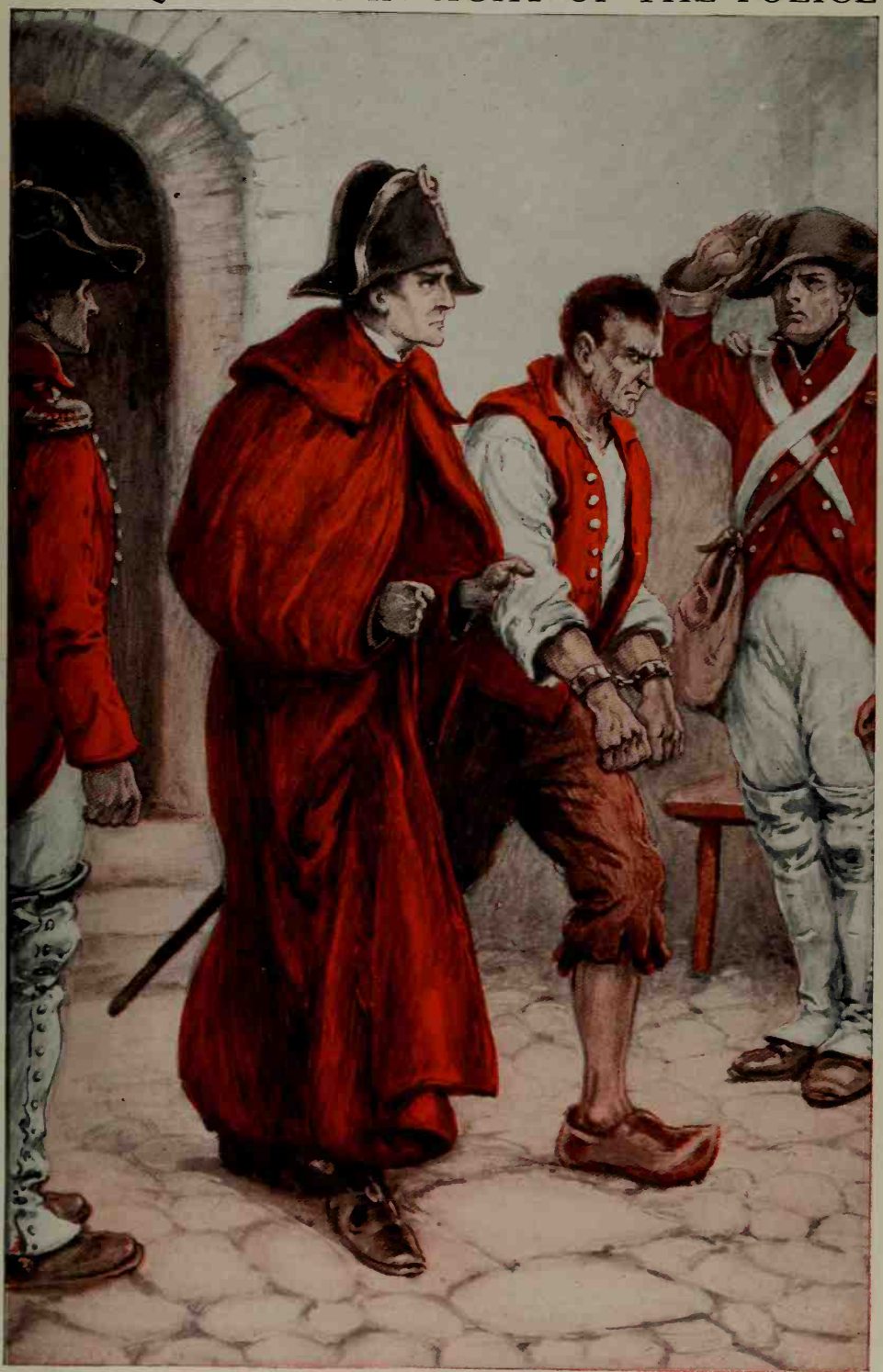
We have not room to tell the full story of this extraordinary person, and so we must hurry over many of his adventures and come to the time when he made his first escape from prison. Locked up on a false charge, Vidocq escaped by means of a woman's disguise, brought into the cell by his sweetheart. Instead of concealing himself or flying from the town, he walked about in broad daylight, and at last went into a tavern. As he sat there a sergeant and four men approached.

YOUNG VIDOCQ WAS WELCOMED WITH TEARS BY HIS POOR MOTHER, WHO ADORED HIM

"If you are looking for that rascal Vidocq," said the escaped prisoner, "hide in this pantry, and you will see him come in. When he enters the room, I will make a sign to you."

No sooner were the five men safely in the pantry than Vidocq quickly turned the key upon them, and said: "It is Vidocq who has locked you in. Farewell, my kind friends, farewell."

VIDOCQ ESCAPES IN SIGHT OF THE POLICE



On the day of his trial, Vidocq, while waiting in a small room, put on the hat and cloak of a gendarme, who had left them there while he entered the court. Then, taking a prisoner by the arm, Vidocq passed out.

A few days after, he was caught and placed in a cell with another prisoner. This prisoner had begun to make a hole in the stone wall, and Vidocq assisted. Just before the day of his trial they thought the hole was big enough for them to escape through. Vidocq crept in, but the hole was too narrow; he could neither advance nor draw back. His agony was so great that his cries brought the sentry, and he was dragged out of the hole, bleeding and nearer death than life.

On the day of his trial he was taken with eighteen other prisoners to the court. They passed a corporal and a troop of soldiers, and entered an anteroom. There were two gendarmes in charge of them. One of these gendarmes put down his hat and cloak and entered the court. Hardly had the door closed than Vidocq slipped on hat and cloak, and, taking a prisoner by the arm, led him quietly to the other door, and passed out before the corporal and his troop.

He was taken again after a few months of freedom, but escaped very simply, because the gaoler one night failed to fasten him in properly. The next time he was caught he found himself thrown into a cell occupied by two desperate prisoners. They told him that they were working their way through the stone floor, and that very soon they would be near enough to the river surrounding the prison to permit of their dropping quietly into the water and swimming away.

At last the burrow was complete, and all they had to do was to drop quietly into the river and swim to shore.

But they had miscalculated. Instead of having to drop into the water, as the last stone bulged out from its place the river came rushing in upon them, and poured, with a roar, up their tunnel. They had dug too deeply. When the gaolers arrived they found the three prisoners splashing about in a flood, drenched to the skin.

After more adventures Vidocq was brought to trial on a charge of forgery. He was perfectly innocent, but his record was so bad, and the evidence against him seemed so clear, that he was pronounced guilty. And then was passed upon him by the judge the terrible sentence of eight years at the galleys.

"The chain of galley-slaves," says a writer of Vidocq's life, "linked two by two, set out upon the march for Brest. By day they toiled on foot, dragging a weight of fifteen pounds at either ankle, or rode upon long wagons, while their irons, white with hoar-frost, struck cold into their bones."

The galleys filled Vidocq with horror. To live there would have driven him mad. He soon made plans for escape. From one of the convicts Vidocq obtained a file, a wig, and a sailor's shirt and trousers. He filed at his chains till they were almost separated, put on his sailor's dress under the convict's garb, and, while he was at work at the pumps, slipped behind some timber, snapped his chains, threw off his prison dress and, putting on his wig, escaped into the town.

But the greatest danger lay ahead. To get out of the town he had to pass the city gate, which was watched by an ex-galley-slave, a man who could detect a prisoner even by his walk. Vidocq, however, marched straight up to him, asked him for a light, and then passed calmly out into freedom.

Soon after he was in prison again, for in France every tramp must show his passport to the police, and so it is very difficult for a man who is once down in the world ever to rise again.

This time he got himself into the infirmary by chewing tobacco which made him ill, and there, by wheedling one of the attendants, he procured a nun's dress, and so escaped.

He made his way in safety to a town where there was a tavern recommended to him by a convict. He found this house, gave the password, and was shown by the landlady into a room filled with desperate robbers, who started at sight of a nun. He was given clothes on condition that he would help in robbing a house. But Vidocq wanted to live an honest life. He escaped from these villains, and made his way home. Always, it seems, this desperate man had a tender regard for his mother.

It was unsafe for him to remain in his native town, and he set off for Holland. Many adventures befell him, on sea as well as on land, and at last he was captured again and once more sent to be a galley-slave, this time at Toulon. He was far worse off now

than he had been at Brest, for he was chained day and night to a bench with the foulest wretches in the prison.

Later on, Vidocq was placed with the working gang, and, soon after, with a file and a disguise, he escaped. But this time he found, to his horror, that no one could pass the city gate without a green card signed by the Governor. As he stood wondering what he should do, the gun sounded from the fortress, telling everyone of a prisoner's escape. At that very moment a funeral drew near, so Vidocq mingled with the mourners, and, in a flood of tears, safely passed through the gate.

He had not walked far when he fell in with a sportsman who asked him if he would join a band of sixty honest citizens who had taken to the woods rather than serve the press-gangs. Vidocq gladly accepted the offer, but soon found that the "honest citizens" were a gang of highwaymen.

One night a bandit declared that he had been robbed of his purse. Vidocq, as the newest recruit, was at once suspected. He was seized and stripped. No purse was discovered, but on his shoulder was the brand of a galley-slave.

It was instantly settled that he should be shot. Vidocq heard the muskets click, but at that moment an idea occurred to him. He whispered something to the captain. The captain agreed to his proposal. He prepared a bundle of straws, and said: "You will each draw one of these straws from the bundle, and the man who has stolen the purse will draw the longest."

When they had drawn, it was found that one of the bandits had a straw shorter than the rest.

"You are the thief," cried the captain; "for the straws were all of equal length, and a troubled conscience made you shorten yours." In this way Vidocq was saved; but he was sent off.

He disguised himself as a peasant, drove cattle, and made his way home; but, later on, he was recognized and arrested. Once more he escaped, and finally came to be a soldier. He distinguished himself, and might have risen in the army had he not been recognized as a galley slave.

He escaped by jumping a dizzy height from his cell window into the river which ran below. He became a tailor in Paris, and there his poor mother joined him. But all the attempts he made to lead an honest life were in vain. He was arrested again, and was once more thrown into prison.

Weary of his life, Vidocq considered how he might deliver himself from the burden of his past, and on page 5111 of this book we read how he fared.

HOW THE THIEF WAS FOUND OUT

MOSTAFA, a wise and rich merchant of Damascus, had an only son, Said, whom he wished to train up in prudence; but Said trusted too much in a young Armenian, who managed to cheat him several times without raising his suspicions.

One day Mostafa and Said were compelled to go on business to Baghdad.

"Now, who can I trust all my money with during our absence?" said the merchant.

"With my friend, the Armenian, of course," said his son. "He is the most honest man in Damascus."

"Very well, Said," exclaimed the merchant. "For once I will rely upon your judgment."

He gave his son a large, heavy strong-box to entrust to the keeping of the Armenian, and when Said returned he took him to Baghdad. Two months afterwards they returned to Damascus, having made a considerable amount of money out of the business they had done.

"Now, my son," said Mostafa, "go to your friend and get my strong-box."

Said went to the Armenian, and quickly returned in great anger.

"You have insulted my friend,' he exclaimed. "It was not money you entrusted to his safe keeping, he says, but a mass of broken stones!"

"Pray, how did your very honorable friend find that there were only stones in my strong-box?" said Mostafa. "He must have broken the three locks, and this, I think, will now prove to you that it was well I entrusted him with nothing of any value."

Said hung his head, and thenceforward he allowed himself to be guided in his judgment of mankind by his father's wisdom and experience.

STORIES OF THE TALMUD

AMONG the volumes held sacred in the world today and for centuries past, the Jewish Talmud will always take a prominent place. It is regarded by the Jews almost as a second Bible, and a great part of it consists of traditions and laws that are said to have been handed down from the time of Moses by word of mouth. It contains the writings of all the greatest Jewish rabbis, or teachers, and consists of history, geography, poetry, law and theology, unlike anything else in all literature. There is much that is dull and trivial; but there is also much that is wise and true, and many good stories, some of which are given below.

THE RICH MAN'S DIAMOND

A RICH Jew, who had a very poor neighbor, was told by a fortune-teller that some day all his wealth would

THE WIND CARRIED HIS TURBAN AWAY

belong to the poor man. This preyed upon his mind, so he sold everything, and with the money purchased a large diamond, which he sewed in his turban.

" Now," said he, " my poor neighbor can never obtain my diamond."

Some time afterward, when he was at sea, the wind carried his turban from his head, and it fell into the water and sank.

" At any rate," thought the Jew, " if I have lost the diamond, my poor neighbor can never get it."

But a few days later the poor man bought a fish in the market-place and upon cutting it open found the diamond, which had been swallowed by the fish.

THE BEAR IN THE WELL

A FOX and a bear were out walking together one day, when, as they passed a house, they smelled the dinner cooking. The fox suggested to his companion that they should creep into the kitchen when no one was there and steal some of the food. The bear agreed; but while they were in the kitchen the cook came in, and the bear was caught and punished. For this he threatened to kill the fox; but the cunning fox said:

" Pray do not let us quarrel. I will take you to another place where we shall certainly obtain plenty of food."

At night the fox led the bear to a deep well, and, pointing to the reflection of the moon in the water below said:

" There is a fine cheese. We will go down and secure it."

He then got into one of the buckets at the end of the rope, and told the bear

"DO NOT LET US QUARREL," SAID THE FOX

to get into the other. But as he was too light to balance the bear's weight, a large stone was placed with him in the pail.

As soon as the bear had entered the other bucket, the fox threw out the stone, and the bucket with the bear inside descended, and was left in the well.

THE EMPEROR AND THE FIGS

AN emperor, seeing an old man planting a fig-tree, asked why he was doing this. The man replied that he might live to eat of the fruit; but even if he did not, his son would enjoy the figs.

THE EMPEROR ACCEPTED THE PRESENT

"Well," said the emperor, "if you do live to eat of the fruit of this tree, I pray you let me know of it."

The man promised to do so, and, sure enough, his life was prolonged until the tree grew and bore fruit which the old man ate.

Packing some of the finest of the figs in a basket, he set out for the palace, and, when he arrived there and explained his errand, he was shown by the guards into the emperor's presence.

The emperor was so pleased that he accepted the present of figs, and ordered the old man's basket to be filled with gold.

Now, next door to this old man there lived a woman who was very covetous, and, seeing his good fortune, she packed some figs into a basket and persuaded her husband to take them to the emperor in the hope of receiving, in return, a basket full of gold.

But the emperor, on learning the man's errand, ordered him to stand in the courtyard, and had him pelted with the figs. When the man arrived home and told his wife all that had taken place, she consoled him by saying:

"Ah, well! you may be thankful they were figs, and not hard cocoanuts."

THE KING'S WATCHERS

A CERTAIN king, who had an orchard of fig-trees, prized the fruit so highly that he determined to have the trees guarded in order that the fruit might not be stolen. For this purpose he placed in the orchard a blind man and a lame man.

The next day when the king visited the orchard, he found that much of the fine fruit had gone, and he asked the watchers what had become of it.

"I do not know," replied one man.

"Nor I," said his companion.

The king then asked if they had eaten the fruit themselves.

"I could not steal the figs," said the lame man, "for I could not walk up to the trees."

"And I could not take them," said the blind man, "for I cannot see."

But the king was very wise, and he soon discovered that the blind man had carried the lame man, and that while the blind man had used his legs, the lame man had used his eyes and hands, and in this way the figs had been stolen. Both the men were severely punished.

THE KING ASKED IF THEY TOOK THE FRUIT

THE LITTLE LOMBARD SENTINEL

A VERY popular work with the children of Italy is "Cuore," which means Heart. It is written by E. de Amicis, in the form of a schoolboy's diary. Every month it contains a true story of a boy hero, and this story from "Cuore" has been translated by a clever little subscriber to the BOOK OF KNOWLEDGE, Cesarina Cagnetta, who is only ten years old.

THE event written down in this little story happened in the year 1859, a few days after the battle of Solferino and San Martino, won by the Italians and French over the Austrians, during the war for the liberation of Lombardy from the oppressive yoke of the latter.

One early June morning a little company of the Saluzzo cavalry wound its way slowly by a lonely pathway in the direction of the enemy. It was inspecting the country on all sides. The company was led by an officer and a sergeant; and all gazed silently into the distance, their eyes fixed, ready to see at any moment the white uniforms of the outposts of the enemy between the trees.

In this way they came up to a small cottage surrounded by trees. In front of the door a boy was standing; he might have been twelve years old. He was peeling a thin branch with his penknife to make himself a stick. From a window of the cottage a large Italian flag was fluttering in the gentle breeze, but the cottage itself was quite deserted. The peasants, having hung out the flag, had immediately made haste to run away for fear of the Austrians. The moment he saw the horsemen the boy threw away his stick and lifted his cap. He was a handsome lad, possessing an open face, with big blue eyes and fair hair. He was in his shirt-sleeves; and the unbuttoned collar showed his bare neck.

"What are you up to here?" asked the officer, stopping his horse. "Why didn't you leave with your family?"

"WHAT ARE YOU UP TO?" ASKED THE OFFICER

"I have no family," answered the boy. "I am a foundling. I work a little for everybody. I am waiting here just to see the war, and watch the Italians defeat their foes."

"Have you seen any Austrians pass?"

"No, not for three days."

The officer sat still, thinking a moment; then he dismounted, and, leaving the soldiers, he went into the house and up on to the roof. The cottage was low, and from the roof he could see only a small stretch of country.

"One would have to climb a tree," thought the officer, and came down.

Just in front of the court a tall tree shot its leafy top into the blue sky. The officer was still lost in thought, looking first at the tree and then at the soldiers. All of a sudden he turned to the boy and said:

"Can you see well, my lad?"

"Me? Oh, I could see a sparrow flying a mile away!" answered the boy.

"Could you climb to the top of that tree?"

"To the top of that tree? In half a minute!"

"And do you think you would be able to tell me what you see from there—if there are any Austrian soldiers in that direction, or clouds of dust, or guns that shine, or horses?"

"Of course I could."

"And what shall I give you for being such a help to us?"

"What shall you give me?" repeated the boy. "That's good! Nothing! If it were for the Austrians—never! But for ours! I am Lombardo!"

"Very well, then, climb up the tree."

"A second, while I take off my boots," said the lad.

He pulled off his boots, tightened the strap round his waist, threw his cap on the grass, and flung his arms round the trunk of the tree.

"But look out," exclaimed the officer, putting out his hand to stop the boy, as though a sudden fear had flashed through his mind.

The boy turned round to look at him, a question in his frank blue eyes.

"It is all right," said the officer. "Go on, climb up the tree!"

The brave boy climbed like a cat.

THE BOY WAS AT THE TOP OF THE TREE

"Look in front of you!" shouted the officer to the boy.

In a few seconds the boy was at the top of the tree, his body clinging to the slender trunk, his legs hidden by the branches; but from his waist upward there was nothing to shield him. The sun beat on his fair head, making it almost golden. The officer could hardly see him, he looked so small up there.

"Look right in front of you!" shouted the officer anxiously, as he gazed up at the lad.

The boy, to see better, loosed his right hand from the tree, and shaded his eyes with it.

"What do you see?" asked the officer.

The boy leaned towards him, and putting his hand to his mouth, shouted:

"Two men on horseback on the white road."

"How far from here?"

"Half a mile!" replied the lad.

"Are they moving?" asked the officer.

"No, they're not."

"What do you see?" questioned the officer, after a moment's silence. "Look to the right." The boy looked to the right.

Then he said:

"By the cemetery, through the trees, there is something that glitters. I don't quite know, but I think it's bayonets."

"Do you see people?"

"No; I expect they're hidden by the cornfields that lie beyond the trees."

At that moment a bullet whistled high through the air and buried itself in the ground behind the cottage.

"Come down at once, boy!" shouted the officer. "They've seen you. I don't want anything else. Come down!"

"I am not afraid," answered the boy.

"Come down!" repeated the officer. "What is there to the left?"

"To the left?"

"Yes, to the left of you."

The boy leaned to the left. At that instant another bullet whistled through the air.

The ball had passed very near the tree.

"Come down!" shouted the officer in a sort of frantic, fierce command.

"I'll come down at once," answered the boy; "but the tree shields me. Do you want to know what is to the left?"

"Yes," answered the officer. "But come down!"

"To the left," shouted the boy, stretching his body to that side, "where there's a little chapel, I think I see——"

A third ball cut through the air, and the boy turned. For a moment he seemed to cling to the trunk and branches, and then he fell head foremost, with open arms.

"Alas, the poor lad!" cried the officer, rushing up.

The boy fell on his back, his arms outstretched; a little stream of blood flowed from his left side. The sergeant and two soldiers leaped from their horses. The officer bent down and unbuttoned the boy's shirt. The ball had entered the left lung.

"He's dead!" exclaimed the officer.

"No, he's alive!" answered the sergeant, holding his hand.

"Poor boy — brave little fellow!" cried the officer. "Courage, courage!"

But while he was saying "Courage" and pressing his handkerchief to the wound, the boy opened his eyes wide and seemed to look at him, his head fell back, and he died.

The officer turned pale. He held him for a moment longer, gazing at him, then laid him on the grass. He

got up and stood looking down at him; and the sergeant and the two soldiers stood motionless over him.

"Poor boy! but what a courageous little chap he was!" the officer repeated sadly.

Then he went into the house, took away the Italian flag, and spread it over the little dead body, leaving only the face uncovered. The sergeant picked up the boots, the cap, the half-peeled stick, the knife, and put them all together at the boy's side.

They stood silent for a moment, then the officer turned to the sergeant.

"We will send the ambulance for him," he said. "He has died as a soldier; the soldiers shall bury him!"

When he had said this, he kissed his hand to the boy and shouted, "To horse!" The soldiers jumped on to their saddles, the company formed again, and they resumed their march. By the same road that the cavalry had trod that morning, passed in the evening a large battalion of soldiers who had fought valiantly a few days before at the great battle of San Martino.

"BRAVE LITTLE FELLOW!" CRIED THE OFFICER

The story of the boy's death had already spread among the soldiers before they left the camp.

The path, which was on the bank of a little stream, ran within a few steps of the cottage. When the first officers of the battalion saw the little body stretched at the foot of the tree and covered by the flag, they saluted with their swords; and one of them, as he passed, snatched a few blossoms and threw them on the little form.

Then all the men, as they marched, plucked flowers too, and scattered them over that silent form. And officers and soldiers alike saluted him as they passed.

"Bravo, bravo, little patriot!"

One officer took off his medal for valor and threw it to the boy; another stooped to touch the cold forehead.

And the flowers still rained on his fair head. And he slept on in the grass, as though he was glad to have given his life for his dear country, Lombardia.

THE LAWYER AND THE OYSTER

AS two men were walking by the seashore, they found an oyster, and began to quarrel about it.

"I saw it first," said one man, "so it belongs to me."

"I picked it up," said the other, "and so I have a right to keep it."

As they were quarreling a lawyer came by, and they asked him to give his opinion in the matter.

The lawyer agreed to do so, but, before he would give his decision, he required that the two men should give him their assurance that, whatever he might say, they would be quite satisfied with his judgment. Then the lawyer said:

"It seems to me that you both have a claim to the oyster; so I will divide it between you, and you will then be perfectly satisfied."

Opening the oyster, he quickly ate it, and very gravely handed to each of the men one of the empty shells.

"But you have eaten the oyster!" cried the men excitedly.

"Ah, that was my fee for deciding the case!" the lawyer calmly replied. "But I have divided all that remains in a fair and just manner."

That is what generally happens when two quarrelsome persons go to law about anything they cannot agree upon.

THE NEXT STORIES ARE ON PAGE 5109.

WHAT THIS STORY TELLS US

THE whole of our perceptions and ideas and beliefs and all our reasoning are built up on the basis of sensation and memory. When we see a chair, and know that it is a chair, that knowledge is called a percept, which simply means a thing perceived. The natural tendency of the mind, at all times, is to make percepts; to put things together and see what they come to, so to speak; and so when we see a chair, or anything at all like a chair, the new sensations coming into the mind are not merely received, but are dealt with. The mind has already in it the memory of many percepts which it called chairs, and the memory of these goes to form part of the total impressions that our minds get. In other words, memory of past sensations, and especially of past sensations that have been built up into percepts, enters into all our new sensations.

WHAT HAPPENS WHEN WE THINK

CONTINUED FROM 4858

WHEN we come to study sensation, we must remember that it is impossible for us to tell what a pure sensation is like, because we never feel a pure sensation. Every sensation we get after early babyhood is mixed up with the memories it revives. We must also remember another very important thing. One old wrong view of the mind—wrong even though it was held by so great a man as John Locke—was that it is like a smooth white sheet of paper on which the outside world comes and prints its marks. According to this view, the mind, like a sheet of paper, is quite passive; it does nothing when we receive sensations, save only to accept them. It contributes nothing at all of its own, and all that can be said of it is that it is there, and receives.

We now know that this is very far from being the truth. One of the great facts recognized now by all students of the mind, and seen to be very important, is that when things are coming into the mind, the mind is not passive, but active. When we hear a piece of music, our minds are doing just as much in their way as the mind and fingers of the player are doing in their way.

For one thing, if we are paying attention, that in itself is an act, and, as we all know, sometimes a very difficult one, and just as tiring as hard running or as swimming. More than that, many parts of the brain, specially concerned with the subject in hand, are roused to activity when new sensations come in. The mind is always trying to make sense of them, as we say, though the phrase is rather misleading. All the time, though we are often quite unconscious of it, the mind is comparing what has just come in with what has come in on previous occasions—putting two and two together, saying this must be a chair, and that is my brother; or, on a higher plane, declaring that this thing is true because something else that we know proves it. The higher and better the brain, the more certainly it is doing these things, whenever we read or look or listen, and therefore nothing can be a greater mistake than to suppose that sensation is a passive process, as when a sheet of paper is written upon.

If we have attended carefully to what has just been said, we must have noticed in it hints of another process which follows upon sensation and perception and real attention. That process is what happens when one thing, entering the mind, calls up the memory of another.

The name of this process is *association*. It is usually called the *association of ideas;* but that is not a very good name, because we associate, more or less, anything and everything

that enters or can exist in the mind. Sights, sounds, tastes, feelings, and everything else, as well as ideas, are nearly always associated in the mind.

We say that one thing reminds us of another. This is to say that, acting through memory, one thing is associated with another; but association is not limited just to the times when we notice and remark how one thing suggests another to our minds. It is really going on all the time, in small things as well as in great; faintly, as when we are just noticing things in a general way, or vividly, as when we are thinking with all our might.

THE WONDERFUL WAY IN WHICH OUR THOUGHTS ARE LINKED TOGETHER

The first man to write down anything like a clear account of this great law of association was the Englishman, Thomas Hobbes—of whom we read on page 4628—and this subject has always been studied more especially in England than anywhere else since his time. It is very interesting that, in later years, we have been able, by studying the course of the fibres in the brain from one part to another, to get some key to the way in which association works. Certainly these discoveries would have deeply interested Thomas Hobbes.

We realize now that all thinking is *relationing*, as it is called—that is to say, associating. We can understand how it is that the greater part of the human brain consists of association cells and association fibres. They are not directly concerned with any kind of sensation, but are concerned with linking up our sensations, so that, by a gradual and orderly process, it is possible for our minds to pass from an infant's first dim appreciation of the difference between light and darkness to the highest ideas which we can have, such as the conception of the nature of light, and the Power whence it springs.

HOW ALL OUR THINKING DEPENDS UPON OUR MEMORY

Though association is so wonderful, and lies at the bottom of all thinking, yet the laws of its working are really not very difficult to understand. It depends, of course, upon memory. Let us ask ourselves why it is that one thing calls up another and not something else, and why it calls up one thing to one person and another thing to another person. Why does a cat suggest a mouse to our minds, or why, to a particular person, should a chair suggest the name of some old friend, perhaps, who has been dead for many years? It is possible to answer these questions fairly well. We associate things when we have seen them at the same time, which would mean an association of place as well as of time; we also associate things because they are like one another, and sometimes, though it sounds curious to say so, one thing suggests another just because that other thing is very different. The last two cases we may call association by likeness and by contrast.

These are all the kinds of association that are usually described; but perhaps there is also a kind of association of cause and effect in the minds of people who are likely to think of causes and effects. Probably this is so, because we are sure now that there is a kind of memory which goes by causes, as when we remember a thing because we know the reason for it. This is much the highest type of memory.

CLEVER ANIMALS THAT APPEAR TO THINK LIKE MEN

Learning of every kind depends upon memory. It is certainly true that all except the very simplest kinds of learning, and perhaps those also, depend upon association. The writer does not believe that human beings are the only creatures that have this power. Animals have it in some degree, and the more intelligent the animal is, the clearer is the evidence we get of the association of ideas.

A striking case is that of the old war horse which, when it was young, plunged into battle at the bugle's call. Years afterwards the sound of a bugle may rouse it to the most tremendous excitement and expectation, because there has been established in its mind an association of ideas between a bugle and a battle. This association of ideas may, of course, be noticed in dogs; indeed, there is no doubt that dogs have a certain amount of power of reasoning, and there can be no reasoning without association of ideas.

In human beings the power of association varies greatly, and, on the whole, we may say that, beyond a doubt, the greater, the deeper, the wider, the richer, the more varied the power of association in a person, the higher and finer is the

mind of that person; but we must particularly add that the quality of the associations made counts for everything. To one man it may be the mere surface which suggests something else; but to another man it is the truth underneath.

THE DIFFERENT THINGS A NAME MAY BRING INTO TWO MEN'S MINDS

The lowest kind of association worth mentioning at all is the case of punning, though, of course, punning may be amusing and delightful in its way. But there is all the difference in the world between the man to whom the word Socrates suggests some joke about a sock or a rat, and the man whom it reminds of the death of Socrates and of his words, "Fear not for me; to the good man no evil thing can happen." Each of these is a case of the association of ideas; but the one man is only a punster and the other is a thinker.

As association is so all-important, how far may we hope to improve it in ourselves and others; can we do so, or can we not?

Association depends upon what there is to associate, and that depends on past sensation and perception. To go back to our previous instance: if all that one man knows of Socrates is that he once read a book in which that was the pet name given to a cockatoo, the name of Socrates cannot suggest to him any more than what the book makes possible. But if the same man, instead of reading that book, had read Plato's account of the death of Socrates, then the name would suggest to him something with a deeper meaning.

WHY WE SHCULD THINK ONLY OF THINGS WORTH REMEMBERING

One of our great duties towards ourselves, therefore, which we cannot begin to understand or to practise too soon, is, first, to fill our mind with things worth having, and worth being reminded of by association in after years; secondly, to avoid, as far as possible, foolish books, the talk of foolish people, and things of that kind which it is not worth while to have in our minds at all; and, thirdly, to avoid things which are actually wicked or disgusting or destructive. These may get into the mind by accident before we know what is happening, and at any moment we are liable to be reminded of them. Even though the purse be rather lean, let us remember that there is no better treasure than a mind well filled with beautiful, true, and valuable memories of noble things seen, noble sounds heard, noble ideas, great poetry, recollections of friends, and so forth. A man with such a mind may say to himself, "My mind to me a kingdom is," or may talk with Wordsworth of "that inward eye which is the bliss of solitude."

We cannot express too strongly the importance of what has been said about filling the mind with good materials for association. It applies to everybody, whatever his business in life. The artist cannot see too many beautiful sights, the man of science cannot store away in his mind too many truths, and the greatest man of science is the one who has in his mind many truths of different kinds, and who can associate them together.

THE DIFFERENCES BETWEEN BRAINS THAT CAN NEVER BE ALTERED

But when all is said and done, the fact remains that there are natural differences between various people, which there is no doing away with or getting over. These differences depend upon something in the making of the brains of the persons in question, and they simply have to be accepted.

Different brains vary very much in the number of their association cells and association fibres, and also in the course which the fibres take. We do not know very much yet about the subject from this point of view, for the comparison of brains has really only just begun; but we know a good deal more about it from the study of actual people and the way in which their minds work.

Of course, we shall only be confused and come to wrong conclusions if we do not allow properly for the effects of education, and the differences between the contents of different people's minds. Often, of course, it will be difficult to say to what extent the differences between people are due to differences in what has been put into their minds, and to what extent they are due to the very nature of their minds. But though we shall often be uncertain, yet still there is clear evidence that people differ naturally in these respects, and also that these differences are the real basis of the differences existing between one man's

mind and another—the stupid and the clever man, the poet and the man of science, and so on.

SOMETHING THAT BOYS AND GIRLS CAN DO QUICKER THAN OLDER PEOPLE

In the first place, there are differences in mere quickness of association, as we all notice in the talk of different people. The process is often extraordinarily quick in children, as their sharp replies testify. In old age it becomes very much slower. There are also differences in the variety of association, some people's minds always running more or less in one direction, while the mind of a great poet, like Shakespeare, makes associations of every conceivable kind.

Some of the special kinds of association are worth noticing, especially as we cannot too soon realize that these differences are natural. If the world were wise, one of the greatest tasks it would set itself would be, in the interests of everybody, to find out quite early the special natural tendencies of different children, and then to try to make the most of them on the lines which Nature has dictated. So many lives are spoiled, so much time is wasted, so much misery caused by our trying to make a child into this, or that, or the other, when the whole structure of his mind, if we could only see it, declares that he will never do that thing well, but might do something else very well indeed.

It is true that there are a great many people in whom there is no very marked tendency in any one particular direction. But very often we think that such is the case when really we have just failed to keep our eyes open.

WHY SOME PEOPLE ARE QUICK AND CLEVER AT ARITHMETIC

In some minds associations are keen and strong in the direction of numbers. No one can say what it is in the brain that decides this, but for practical purposes it really does not matter—the fact remains. Counting, calculating, measuring, reckoning, comparing in terms of length and number and quantity—all these are things which come naturally to a person, and, like other things which come naturally, are done with pleasure. Apart from lessons or work, his interests and pleasures and games, the things he wants to know and find out will largely take the direction of numbering and measuring and calculating.

Now, there are many good and useful careers for such a person; but, on the other hand, there are people in whom associations of number are few, slow, difficult, and, indeed, positively unnatural, though they may take a deep interest in flowers and plants, the face of the sky, the weather, the wind, and so on.

Are we right in trying to make bank clerks, shall we say, of these people, or ought they go to a farm to help in the great work of providing food for mankind?

While some people think in numbers, others, of somewhat the same type, think easily and quickly in terms of space. Some like putting things together and taking them to pieces; they like making little toy machines; they want to know the method by which everything works, and are naturally clever in knowing what will fit into a certain space, and how to make a toy work in one way if it will not work in another.

THE KIND OF PEOPLE WHO ARE CLEVER AT UNDERSTANDING MACHINES

These are the practical people to whom engineering probably offers the best careers, though we must not judge by the tastes which children of five or six or seven years old have, as these tastes often come and go. If associations of number are strong in these people, so much the better for them, for mathematics and geometry go well with the engineering faculty, and help to make the best engineers.

In the highest types of this kind of mind it is possible not merely to understand associations which earlier minds have formed, but to form new ones which no one has ever formed before. So that a person of this type does not merely understand the old machines, but he can invent new ones.

If he be working more at theory than at practice, his powers will show themselves in devising new experiments and new kinds of apparatus with which to make experiments, and the practical difficulties, which would utterly dishearten people of another type, give him pleasure to conquer. Other people's minds would simply stop working, but his seems to think more clearly.

These are the people who make either great inventors or great experimenters, adding to our knowledge of heat and electricity and light, and so on. Mr.

Edison is the finest example alive of this type of mind working at practical invention; and it is certain that if he had chosen to invent machines with which to experiment, instead of inventing things for practical purposes, he would have been no less successful.

Such a great worker as Sir Joseph Thomson, who is held in great honor in this country, offers an instance of this type of mind devoted to scientific experiment. Lord Kelvin was the greatest example of the same type of mind in the nineteenth century, and he divided his time between practical invention and scientific experiment. In each he was as successful as any man ever was, and he very clearly showed that it is the same type of association which makes the inventor and the man who experiments.

People who can make pictures in their minds

In inventing and experimenting, in engineering, and in geometry, too, there is a good deal of seeing with the mind's eye—making visions in the mind of how things will work—how they will go together, how they will fit, how they may be arranged, and so on.

This power of making pictures in the mind is called *visualizing*, and in all people with this kind of mind visualizing is very powerful, and it forms their most natural way of thinking. Not only can they call up in their mind very clearly the memory of past *percepts*, so that if they have once seen a machine work they can always recall to mind how it worked, but also, as we have seen, they can make new percepts in their minds, and then make them real—and then we get a new invention, like the steam-engine or the phonograph.

There is another type of visualizing mind which, though it is the same in a way, is very different. In the type of mind we have been discussing, associations of cause and effect, and also a good deal of calculating, commonly come in. These people are not much concerned with the outside appearances of things; they perhaps take no particular pleasure in beautiful color or form. But there is yet another kind of visualizing, not at all scientific or inventive, and yet invaluable in its own way, where the associations in the person's mind go more by the appearances of things, and especially by comparisons and recollections of their form and color, their light and shade, their appearances at different times of the day, at different times of the year, and so forth.

The things that help to make artists or sculptors

In the autumn some people can call up clearly in their mind's eye the vision of what a certain landscape looked like in the spring. It is natural for them to notice these things, and to make these comparisons or associations. When they are talking to people, they do not attend very particularly to the tones of the voice, and they are perhaps not particularly interested in what is being said, but they are watching and remembering and comparing what other people never notice at all, even in the faces of people that they love—the movement of the eyelids, the little tricks of the lips, the poise and movement of the head, and so on.

These people are the artists, drawers, painters, sculptors, architects, and decorators. It is unfortunately true that the artistic people usually despise the scientific people because they care so little for beauty, and often make such ugly things; and the scientific people, in their turn, despise the artistic people for caring so much about the mere surface of things, and being so little interested in what lies behind them. But when men grow wiser they will learn how foolish all this is, and that both these kinds of people are necessary, for it takes all sorts of people to make a world.

The people who think by sound rather than by sight

Now, there is another great type of mind, and this is found in two very different kinds of people; but they both agree in that the associations for which their brains are best fitted do not go so much by the eye as by the ear. All the other people, on the whole, may be classed as visualizers, and their way of thinking is mostly visualizing, or making visions, old or new, in their minds. But in these other people we are speaking of the power of visualizing is much less strong, and their chief way of thinking, that is to say, of forming associations, is by sounds, and not by sights. In such an animal as the dog, associations go chiefly by smell, but in human beings smell has lost its import-

ance, and only sounds and sights need be considered. So these people who think and associate mostly by sounds are called *auditives*.

How we hear in our minds the sound of a word that we see

Man has learned to do many wonderful things, and especially he has learned to write down marks which stand for sounds, and this invention of written language, and the making and reading of books, really belongs to the working of this kind of mind, though actual hearing and sound may not come in. Nevertheless, we imagine the sounds of the words as we read them; and so, though we are using our eyes to read, and do not seem to be using our ears at all, yet the processes that go on in the brain and in the mind are practically the same as those which go on when we listen to a person speaking. So we can understand what kinds of minds the auditives have.

Some of them, the musicians, are deeply interested in sounds just as sounds; they remember tunes, and can reproduce them; they can even make new tunes; they can imagine in their minds how one kind of instrument sounds with another, or how certain notes will sound when they are played together, or one after the other. So, just as the artists make pictures, these people make music. It is as easy and natural for a musician to make a tune, and perhaps as impossible to put a machine together —much less to invent a new one—as it is easy for the engineer to invent a machine and impossible for him to invent a tune.

Of course, we are not saying that many people do not combine more than one of these powers of association. There are such people and they must be considered to be very fortunate.

The highest kind of mind that a man can have

We now come to what is, on the whole, the greatest of all the types of mind, and this belongs to the people whose interests are naturally with words. In them the human mind is at its best. When a person speaks, they are not so much interested in the movement of his lips and eyes as the artist is, nor yet the tones of his voice as the musician is, but rather in the meaning of what he says. Just as a musician remembers tones and tunes, and the artist remembers colors and forms, so these people remember words and phrases, and the ideas which are expressed by these words and phrases.

The one type of men can associate lines together to make a picture; another puts notes together to make a tune; and the third puts words together to make a thought. Now, pictures may be just the same as thousands of pictures before them; tunes may be just the same as many tunes before them; and so, of course, may sentences, phrases, ideas, and thoughts.

But the small number of great people whom we call original, and who make the progress of the world, can not only remember and reproduce the old associations, but they can make new and original ones; and so just as we have great pictures, great statuary, great buildings from one type of mind, or great music from another, so from this last type of mind great thoughts will come.

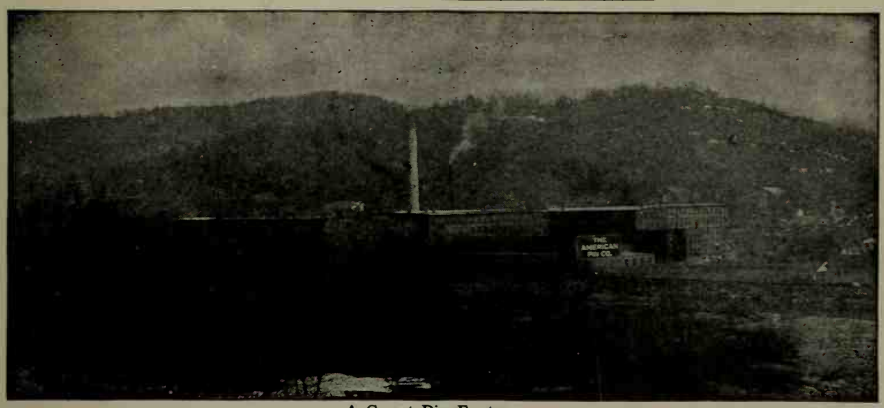
The wonderful mind of the poet, who draws life from the soul

Every now and again there comes into the world a person whose mind combines both varieties of the auditive type. He not only has ideas made by associating words, but he is also concerned with the musical quality of words, and takes pains to put them together so that they have a pleasant rhythm.

This man is a poet. The greatest poets are visualizers as well; they can see great pictures in their minds, as Milton saw pictures when he wrote "Paradise Lost"; or they can recall the appearances of Nature, as when Wordsworth wrote his poem about the daffodils. Their minds are so rich, and have so many powers of association, that they can compare things together which other people would not think of comparing.

All these qualities added together, perfectly blended, and governed by something which is deeper than all associations, and which we can only call the soul, went to make the few sublime poets of the world; who thought and saw and heard and felt and sang, remembered and prophesied, and did all these things so well, and blended them so wonderfully, that their poetry must be called the greatest and most glorious of all the varied products of the human mind.

THE NEXT PART OF THIS IS ON PAGE 5079.



A Great Pin Factory.

THE STORY OF A COMMON PIN

CONTINUED FROM 4940

ALTHOUGH pins have been used since the very earliest times, we cannot tell you very much about their history, because they have always been such very common things that no one has thought very much about them, and they have not been large enough to escape destruction. Nevertheless, what we do know about their story is very interesting, and to find its beginning, we have had to go back and read the unwritten book found in the relics left by primitive man.

When the growing cold of the glacial period made it necessary for man to cover himself with warm clothing, he had to find something to fasten together the skins with which he clad himself, and he found a sharp thorn! If you take a common brass pin out of your pincushion, you will see that it still keeps the shape which our primitive forefathers found of so much use. Until quite lately the gypsies continued to use thorns, boiled in oil to harden them, as pins. Some of the North American Indians used thorns of the honey-locust for the same purpose, and the Egyptian peasant women of our own time use thorn pins.

Our cave-dwelling ancestors knew of no way of hardening their thorn pins, which were not very durable, but some cave genius got the bright idea of using a splinter of bone, and this new fashion spread. At first the bone pins were very roughly made from the leg bones of small animals, and show the joint which was left at the top for a head, but by and by they were smoothed and polished. Some of the artists of the late Stone Age were able to make quite beautiful pins with well carved heads and smooth, polished points.

When bronze was invented, and the Bronze Age began, it was found that better and smaller pins could be made from the new material. But very large pins were also made, and the flowing robes of the Greek women seem at one time to have been fastened together by them. The story told is that one lone man, who escaped from a battle, was put to death by the women of Athens, who stabbed him again and again with their long dress pins. After that, the story says, they were compelled by law to sew their robes, and were not permitted to use pins. The Romans of the Iron Age used ivory pins and bronze pins. Gold pins were also used by them, and some of their bronze pins were small and fine. Probably silver pins were also used. Fine pins made of this metal were found in the tombs of the Peruvians, who were in the Bronze Age when they were discovered by the Spaniards.

It is impossible to say when the first

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wire pins were made. We know that they were made in England in the fifteenth century, for in 1483 a law was passed forbidding their importation. Nevertheless, in spite of this prohibition, most of the pins used in England were brought from France and Germany, where brass pins were made as early as the sixteenth century. It is said that pins of brass wire were first brought to England for Katherine Howard, the unhappy wife of Henry VIII. In the seventeenth century, however, John Tilsby set up an establishment for the making of brass pins, at Stroud, in Gloucestershire. Not long after, their manufacture was begun in the cities of Bristol and Birmingham, and English pins became noted for their excellence.

Pins were imported to the American colonies from England, and no attempt was made to manufacture them in this country until after the Revolution. In 1775, a prize was offered by Congress for the first twenty-five dozen pins, made in America, equal to those of English manufacture, but the records do not show that the prize was claimed, and the first pin-making establishment in the United States does not seem to have been started until the year 1812. This does not seem to have been very successful, but in 1836 the Howe Company was organized, and succeeded, and millions of pins are now made in the country.

Until the nineteenth century, pins were made largely by hand. The making of the head was a separate process, and was performed by twisting spirals of wire round a spit, and cutting them into lengths of two spirals each. Each shank was then thrust into a spiral, and the two were clamped tight together by a die. This was a very slow process, but in 1824, an American, named Lemuel W. Wright, invented a machine to make pins, in which a solid head was formed in one piece with the shank. He took out a patent for this machine in England, and solid-headed pins were first made there. More than twenty-five years earlier Timothy Harris, an Englishman, had attempted to make solid-headed pins by molding the heads.

A short time afterward, Dr. John Ireland Howe, a New York physician, invented a machine which made more perfect solid-headed pins, and it was this machine that was used by the Howe Company, which opened an establishment at Derby, Connecticut.

At that time as many as fourteen operations were needed to make a pin. Much time was used in its manufacture, and the labor of many men was needed. But a few years later, Samuel Slocum invented a machine to stick the pins into the paper which holds them. This time-saving device succeeded, and since that time other inventions have been made which have proved so useful that, as you may see from the pictures, pins are made almost entirely by machinery. They are made from steel, from brass and iron wire. The very cheapest kind that you can buy, for a few cents a paper, are made from iron wire, the pins that we ordinarily use are made from brass wire, and the best pins are made from hard steel. Black pins are made from iron wire, given a bath in black Japan and dried, while pins for ordinary use are coated with tin to keep them from rusting. The colored glass heads, which are put on many fine steel pins, are made from molten glass. Until quite lately, nearly all these pretty pins came to us from Aix-la-Chapelle, in Germany.

Of course, when pins were made solely by hand, they were quite expensive. Ladies were given a special allowance, called pin money, in the days when very elaborate head-dresses required dozens of pins to fasten them, and the term is still used for dress money. Many proverbs were made about pins, such as "He that would steal a pin would steal a greater thing," "See a pin and let it lie, then in want you'll come to die," all of which, of course, referred to the cost of these small, useful things.

Curious superstitions, of which no one can tell the origin, clung about pins. It was firmly believed, not so very long ago, that sticking pins in a wax image would cause the person in whose likeness the image was made to feel intense pain. Later still, people threw pins into wells, in the superstitious belief that doing so would bring them good luck, and there were other superstitions of the same nature which are interesting to students of old manners and customs. You see, after all, there is something of interest to be said about even so small an object as our useful common pin, which we use and throw away without a thought.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 5039.

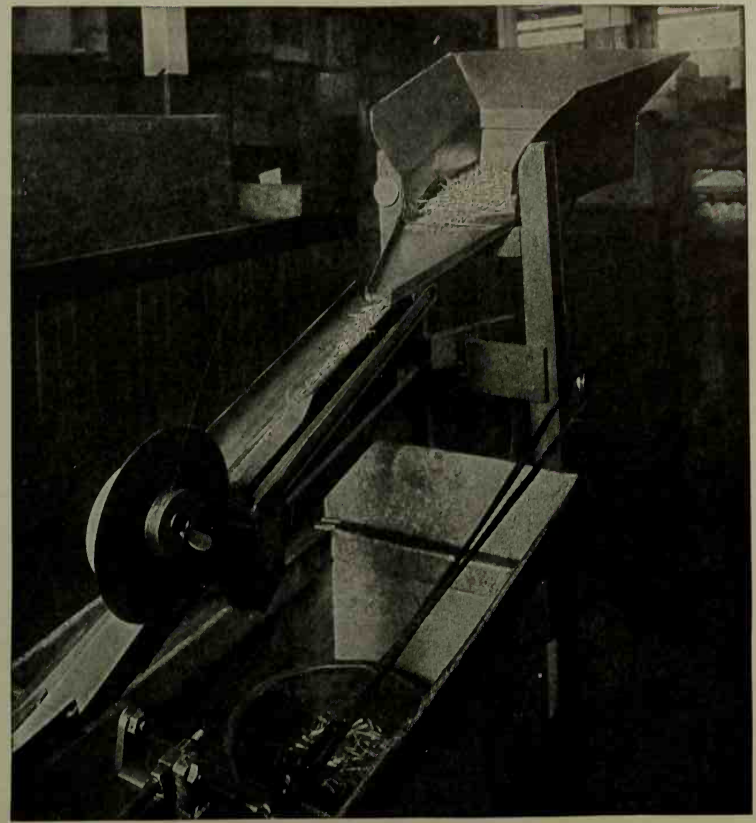
MAKING AND PLATING PINS

This wonderful little machine does nearly all the work of making a pin. The brass or steel wire is wound on the reel near the left hand of the operator and is drawn into the machine, which cuts it into proper lengths, a little hammer springs forward and makes the heads, and then they are sharpened. The pins fall into the pan at the rate of from 200 to 400 every minute. Next they go to the cleaning room.

After being cleaned the pins must be coated with tin to prevent them from rusting. The pins on this table have been poured out from the great can beside the workman. The plates from which the tin has been taken look something like quarters of a pie full of holes. They are made like this in order that as much surface as possible shall be exposed to the action of the solution.

POLISHING THE PINS AND ARRANGING THEM IN ORDER

There is nothing better for polishing than some kinds of sawdust. Bushels of pins are dumped into this great tub and shaken violently. The sawdust is then blown away and the beautiful bright pins are left with heads and points in every direction. They must be arranged so that all the points are one way, for a prickly heap of pins would be unpleasant to use, as you may happen to know.



A scoopful of pins is poured into the hopper, which vibrates gently. In the trough is a narrow slot not quite large enough to let the head through. The body slips through, however, and the points hang down in a line. You can see the heads as they slide down the slot in a continuous stream. In the next picture we shall see what happens to them before they come to us from the shop.

PREPARING PINS FOR THE SHOP

Here is the other part of the last machine you saw. As the pins come down the slot, in order, they are pushed in a regular line through a strip of folded paper. The girl on the left takes the proper length of this paper full of pins and winds it into a tight roll. The girl on the right then slips this roll into the small wooden case ready for your father's desk. These cases are more convenient to use than a paper.

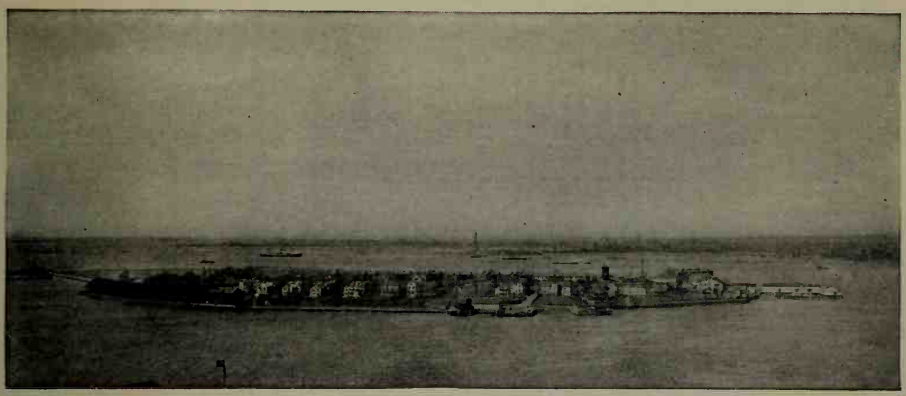
Most pins, however, are sold in flat paper packages. The pins come down, in the same way as above, to this machine, into which paper is fed. The machine crimps the paper, pushes a row through several times, and keeps on repeating the operation. Proper lengths of this paper are then folded and we have the pins you know best.

All pictures of pin-making copyright by Brown Bros.

THE CITY HALL AND CUSTOM HOUSE

The City Hall is the centre of the New York City government. It is not large, but many people think it the most beautiful building in the city, and it is also one of the oldest, for it was completed in the year 1812. City Hall Park, in which it stands, was known in the early days of the city as the Fields, and is famous for Revolutionary meetings held there. There is a fine statue of Nathan Hale in front of the building.

The Custom House in New York is perhaps a little heavy, but it is nevertheless a handsome building, and the well-proportioned pillars give it a good deal of dignity. The twelve statues which you see across the front represent the world's seafaring powers. The stone used in the building is gray granite. It is said that three fourths of the commerce of the United States goes through the port of New York.



WHAT ONE MAY SEE IN NEW YORK

CONTINUED FROM 4770

THE harbors of a country are its gateways from the sea. Therefore we speak of the cities and towns which grow up beside our harbors as ports. They are the doorways through which people come and go, the portals to which the ships of all nations come bearing goods, and from which they sail away laden with the things with which we supply them in exchange.

There are many ports on the eastern coast of the United States, but the greatest of them all is the great city of New York, the largest and most populous city in the world. On the streets of this great city we hear the tongues of all the nations, and see faces that tell us that the people have come from every clime. In the harbor and at the piers, may be found the ships of every sea-going nation. Stores and warehouses are crowded with goods from every country in the world, and ships sail away every day laden with the goods with which we supply these countries in exchange.

Within the boundaries of the city there are crowded streets, and immense public buildings, great museums, manufacturing centres, and even islands and farm lands. Brooklyn, a large city in itself, Long Island City and a number of smaller places on Long Island are all part of the great city, as are the section of the mainland to the north of the city, called the Bronx, which the Dutchman, Bronck, is said to have bought from the Indians, and Staten Island, which shelters the southern end of the harbor.

Most Americans, and nearly all foreigners, when they speak of the city of New York, think and speak of the Borough of Manhattan, which is built on the island of Manhattan, and has grown out of the first settlement made by the Dutch. It is of this part of the city that we shall principally speak to-day, and for the sake of convenience we shall speak of it simply as New York. It is here that the chief financial business of the city is carried on, here its great public offices are to be found, and here are also the shops for which the city is famous.

WHEN NEW YORK BEGAN TO BECOME A LARGE CITY

It was not until about the time of the Civil War that New York really began to grow rapidly, but since that time it has grown by leaps and bounds. Consequently it is one of the most

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modern of cities. A house or office building that has seen forty years go by is looked upon as old. In fact it is almost safe to say that the greater part of New York has been built within the last seventy-five years. As the city grew, streets that before were filled with private houses, were turned over to business. Business houses were torn down to make room for larger buildings. The older part of the city has been entirely rebuilt. Few landmarks have been kept, and it is useless to look for the Old World charm that we may find in some of the older Eastern cities.

There are several ways by which we may enter this famous city, all of them interesting. We may come into the heart of the city through either of the two great railway stations, or we may cross the river by ferry boat from the New Jersey shore, or come down the Long Island Sound in a coastwise steamer, or best of all, if we are coming in from the sea, we shall sail up the outer bay, through the Narrows, across the beautiful landlocked inner bay, and up the mouth of the river, to drop anchor at one of the river piers. As we come up the bay we are struck by the great beauty of the harbor, and the wonderful sky line made by the tall buildings in the lower part of the city. If we sail in through the Narrows, when the waters of the bay, and Bartholdi's great statue of Liberty are lighted up by the setting sun, the towers on the water-front seem to stretch up into the glow above them. Perhaps we may cross the river at dusk, or in the velvety darkness of a summer evening, and if we look up to the tops of the towering buildings as we approach them, and measure them with the lighted ferry boats that glide past us, we may gain some idea of their height.

SOME OF THE FAMOUS BUILDINGS IN NEW YORK

Some of these tall buildings are very famous. The Singer Building carries the top of its tower 612 feet above the street. The Woolworth Building. of which you will find a picture in another place, is over 750 feet high. The figure on the top of the Municipal Building stands over 550 feet above the pavement below. Farther uptown the tower of the Metropolitan Life Building is 700 feet high. The foundations of all the tall buildings have been sunk down to the solid rock, in some cases ninety feet, and in others as much as 130 feet below the street.

Many of the buildings hold thousands of office workers. Eleven thousand people work in the Equitable Building, and at mid-day, when they pour out to luncheon, the high canyon-like walls look down on a wonderful sight. Crowds of men and women surge to and fro in the narrow streets of this old part of the city that is yet so new. At any time between noon and two o'clock, Nassau Street is crowded from wall to wall with an endless procession. In the evening, when the crowds have been carried away by subway train, or elevated train, or street car, or ferry to their homes in the upper part of the city, in Brooklyn or some place on Long Island, or Staten Island, or in New Jersey, all these buildings are deserted. Then the empty streets look more than ever like canyons, and the walls of the deserted edifices send back hollow echoes to the footsteps of the solitary watchman on his beat.

Many of the buildings are handsomely decorated with fine doorways and windows, good carvings in stone, and statuary. The iron grillework of the elevators which carry the workers from floor to floor is well wrought, halls and corridors are lined with marble, or with the decorated tiles of which we have spoken in the Story of Porcelain.

Of course all the buildings are not so tall as those of which we have spoken. Many buildings are of moderate height, and some of the finest are only a few stories high. The Custom House, a square granite building, is one of the handsomest, if not the handsomest building of its kind in the world, but we shall not speak here of the symmetry of the building, the beauty of its columns, the richness of its statuary. The picture on page 5006 can give you a better idea of this than any words that we can say. Three quarters of the foreign commerce of the United States passes through the port of New York, and the customs department well deserves this fine building for its headquarters. It is believed that it stands on the site of the first fort that was built by the Dutch, and we know that it covers part of the ground on which old Fort Amsterdam was built. In front of it is a bowling green, where the old Dutch governors played at bowls. The statue of King George III, which once

THE BATTERY AS IT WAS AND IS NOW

Battery Park, at the tip of Manhattan Island, has always been a favorite meeting-place. This is an artist's idea of how it looked when the Dutch held New York. Most of the land in the park has been reclaimed from the harbor. The Battery which gave its name to the park was built on a rock.

This picture gives an idea of how the tall buildings in Down Town New York look from an aeroplane. The park at the end of the island is called The Battery, and you can see the round building, once a fort, on a wave-washed rock. The building was afterward used as a theatre, and later on it was the immigration station. It is now an aquarium. To the right you can see part of Brooklyn, the East River and the bridges.

stood in the centre of the green, was, as we know, melted down for bullets for the Revolutionary army, and a statue of Abraham de Peyster has taken its place, but the old iron railing still remains.

Near Broadway, on Wall Street, which received its name from the wall of New Amsterdam, stands the Sub-treasury Building, an immensely strong, fortress-like building, in the form of a Greek temple. The shape and proportions of the Sub-treasury are very fine; but much as we admire the simplicity of the building, the strength of its stone walls, and Attic roof, and the severe beauty of its Ionic columns, we cannot help regretting that it was not built elsewhere. To make room for it, Federal Hall, in which the first Congress of the United States assembled, and in front of which the first president took his oath of office, was removed. In front of the building stands the statue of Washington, which is described in another place.

Within a stone's throw of the Sub-treasury is the Stock Exchange, the great stock market which is known all over the world as Wall Street. Visitors may be taken by members of the Exchange to look down from the gallery on the hubbub made by the buyers and sellers of stocks on the floor below. Near by on Broad Street is the Consolidated Exchange, on Nassau Street is the Chamber of Commerce, and not far off, on Liberty Street, is the Clearing House, where the great banks transact their business with one another. The Corinthian pillars, and sculptured Greek front of the Stock Exchange, the fine frieze and dome of the Clearing House, and the statues in front of the Chamber of Commerce are the most notable features of these buildings. The men who spend their days in them control the business of a large part of the world's work.

THE SEAT OF THE GOVERNMENT OF A GREAT CITY

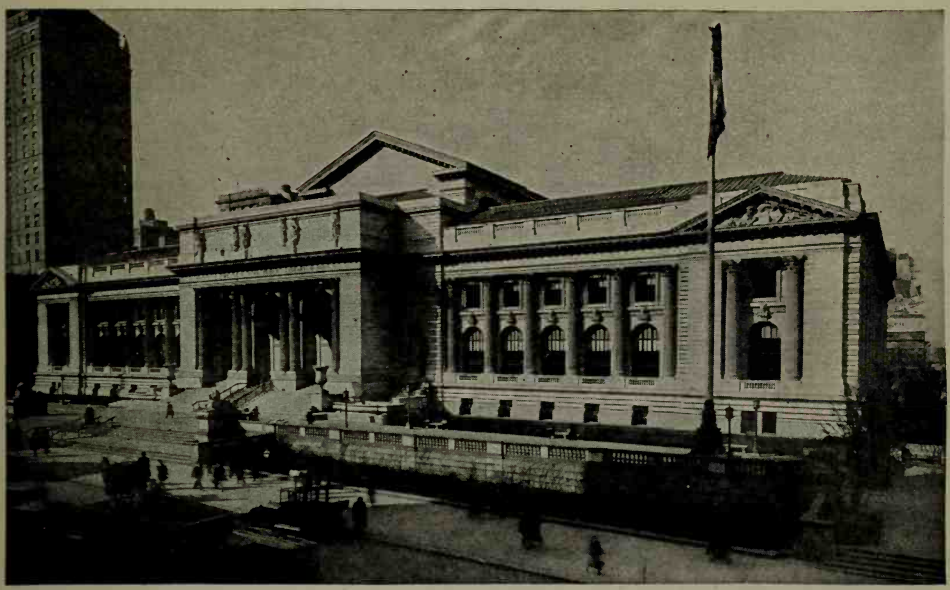
The centre of the city government is not far off, where the City Hall is set in a small park which keeps it apart from the noise and clangor that surround it. The furniture that was used in Federal Hall by the first Congress is in the Governor's Room, and so are the desk and table used by President Washington, and there are some interesting portraits in the building, including the pictures of Hamilton and Washington, which you will find in this book. The City Hall, which was completed in 1812, is one of the few links with the past that remain in the city. It is a beautiful marble building in the style of the Italian Renaissance, and though the tall buildings that surround it, overshadow it, they have not been able to dwarf it. The mayor has his office in the building. The city council meets here, and receptions to distinguished strangers are sometimes held in the Governor's Room. The Hall of Records, in which all the title deeds of Manhattan Island are kept, is just across the corner, and the Municipal Building, in which most of the city offices are situated, is close by. The Municipal Building is one of the largest and tallest buildings in the city. A street runs through it beneath a vaulted archway, and there is a station for subway trains beneath it.

We look in Madison Square for the Metropolitan Life Insurance Building, with its graceful clock tower, like an Italian campanile. Few strangers cross the square when the famous clock strikes the hours without pausing to listen to its deep toned bells. Fine views of the country which surrounds the city can be seen from this tower and from the tower of the Woolworth Building.

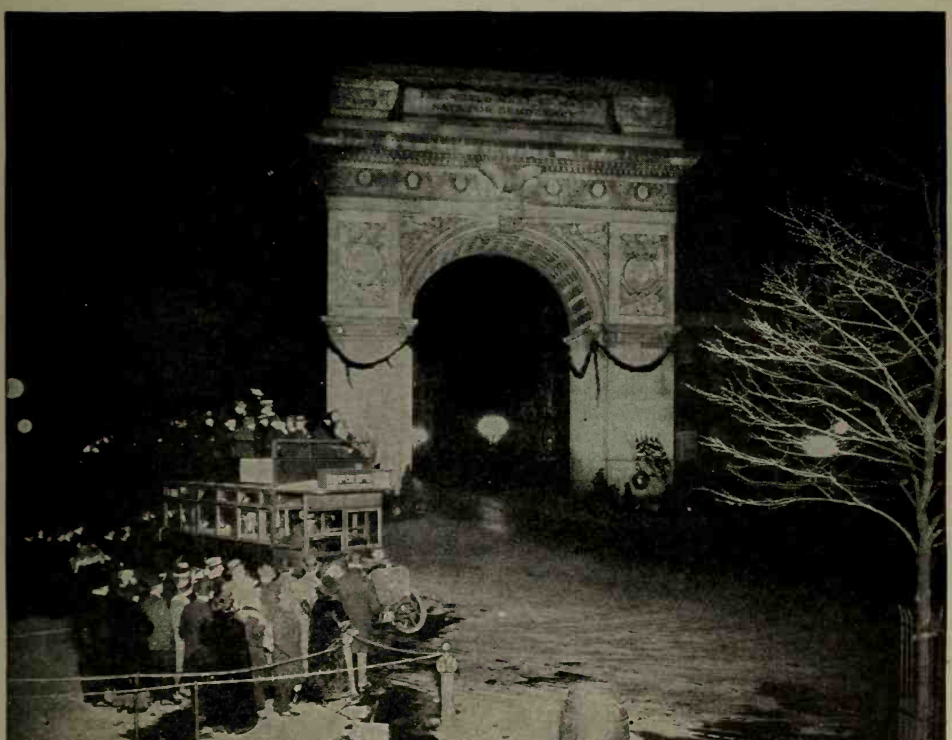
SOME FAMOUS STREETS IN A FAMOUS CITY

In the lower part of the city the streets are irregular and all of them have names, but farther north they have numbers instead of names, and the city is laid out in regular oblong blocks, with their longer sides laid across the width of the island, and it is easy for strangers to find their way about. The shape of the city is so irregular, however, that Broadway is the only street which runs through it from one end to the other. Along the first part of its course, this famous street runs straight, but further north, it "cuts corners" across the city, and on its irregular way toward the Hudson from Tenth Street to One Hundred and Eighth Street, it makes a diagonal crossing of every one of the avenues from Fifth Avenue westward. This leaves odd triangular spaces, some of them large enough for a building, while some give a little open space for a statue, or a plot of grass. On one of these triangles is the Flat-Iron Building, one of the most famous of New York's famous buildings.

TWO OF THE SIGHTS OF FIFTH AVENUE



This fine building is the New York Public Library. Within it there are a circulating library, a library for children, a large newspaper room, a magazine room, a library of technological books, a library of scientific books, a musical library, a library for the blind, a library of art, of Oriental literature, an art gallery, and a large reading-room where any one may go and have books brought to him to study.



Washington Arch is the most beautiful monument in the city of New York. It is built of white marble, and, as you may see, reminds us of the Arch of Titus, on page 5048. The arch is shown as it was decorated and illuminated at night when General Joffre of the French army visited the city in 1917. On the front there are two statues of General Washington.

Two pictures copyright, Press Ill. Service, Inc.

Another makes room for the Herald newspaper office, which is one of the most beautiful buildings in the city if not on the continent. It is copied from a famous Italian palace, and a stranger who knows nothing of the city, is surprised when he finds that it is the home of some of the giant printing presses of which we read in the Story of Printing. You can see the men put the curved printing plates in place, and watch the great presses print off the news of the day.

A short distance further north, Broadway leaves room for the office of the New York Times, which is noted for its graceful tower. Every afternoon in summer you can see a crowd of men and boys around these great newspaper buildings to watch the bulletin boards for news of baseball games or races, and on election nights the streets around are so crowded with watchers for the returns, that it is almost impossible to force one's way through. Many newspaper offices are still downtown near the City Hall, on Park Row, which has been called "Newspaper Row" and "Printing House Square."

To one of the Broadway crossings the city owes Columbus Circle, where the statue of Columbus stands. Round the statue there is a constant roar of city traffic, and it is said that a larger number of wheeled vehicles pass this place than can be found in any other radius of the same size in the world. Above Columbus Circle, Broadway is wide enough to have shrubbery in the centre. Near the Cathedral of St. John it passes the buildings of Columbia University, and in the upper part of the city it is lined with apartment houses in which prosperous people live.

Fifth Avenue, the dividing line of the city, is difficult to describe. The life of this very beautiful, and very famous street is like an abstract of the changing life of the city. Not many years ago it was quite given up to the houses of wealthy people. But business places began to creep in and part of it is now the great shopping district. From Central Park southward, the avenue is wide enough for six carriages to drive abreast, and in the busy shopping hours, the long lines of motor cars, and the crowds of moving people on the sidewalk make a picturesque sight; while a military parade, when the soldiers march down the hill in columns of sixteen, between densely packed crowds of eagerly watching people, is a sight which can never be forgotten. On the upper part of the avenue, which runs along the eastern side of the Park, there are handsome houses, in which many well-known people live.

WHERE WE LOOK FOR THE CITY PARKS

When people who live in New York speak of "The Park" they mean Central Park, an oblong piece of ground about two and half miles long by three quarters of a mile wide, in the heart of the city. In the limits of this small space there are winding roads and paths, rocky places, lakes and woods, fountains and open lawns, tennis courts and playgrounds. It is a beautiful spot, where every advantage has been taken of the natural beauty of the place, and is one of the greatest treasures that the city has in its possession.

Riverside Drive, on the Hudson, is another beautiful city park. On one side there are beautiful private houses and large apartment houses, and on the other side is the river with its ever changing beauty. The older part of the Drive, from Seventy-second Street to the viaduct across the Harlem Valley, is the most beautiful. Here again the natural beauty of the ground has been made the most of. The broad carriageways run under arching trees. Shrubbery has been planted on the sloping ground above the Hudson, and winding walks lead to beautiful views of the river and the Palisades from many points within the park.

The large parks are on the mainland, beyond the Harlem River. Van Cortlandt Park, in which there is a fine old stone house, built at the middle of the eighteenth century, and a beautiful sunken garden, is well worth a visit. There is a good golf course in this park, and tennis courts, baseball grounds and polo grounds where the city people play. The house is a museum for colonial relics. A few miles away, Pelham Park on the Sound makes a fine playground, whither mothers take their children in the summer days. Bronx Park is most loved by the children, for the Botanical Gardens and the Zoological Gardens are there.

Think of all the animals of which you have read in the Book of Nature and then think of a garden in which nearly all of them are gathered together so that they may be seen in one place, and you

TWO SPOTS OF GREEN AMONG THE STONES

Madison Square was once the home of fashion and wealth, but now has become the home of business. The Metropolitan Tower is one of the tallest buildings in the world. The clock can be seen for miles. The building to the left is the Madison Square Presbyterian Church. Madison Square Garden, where generations of New York's children have seen the circus, is on one corner of the park.

Washington Square, where stands the great Washington Arch, erected in 1889, as a reminder that a hundred years before, George Washington had been inaugurated as President in New York City, is one of the most attractive small parks in the city, though many of the old residences are now used for business purposes. One of the buildings of the New York University stands to the east of the park. The lower photograph by Paul Thompson, N.Y.

have an idea of the Zoological Garden. There are lions and tigers, wolves and bears, hyenas and jackals, elephants and hippopotamuses; elks and deer lie in the shade in their yards; wild horses and zebras watch us over the fence; a herd of bison wander round a large yard; water fowl swim on the lake and birds flutter about the large open-air aviary. Of course there are many animals that have to be kept behind iron bars, but as far as possible the animals are allowed during the daytime to go in and out of their houses, within their enclosures, at will.

In Battery Park, down at the southern end of the city, you will find the aquarium, where fishes of many kinds swim about in glass tanks, so that you can watch them and study their queer habits. There are a number of smaller parks and a number of public squares in the city, and indeed, there are few large cities so well supplied as New York with open spaces where trees and flowers grow. Morningside Park is a lovely little uptown park, and a little further north St. Nicholas Park, on the rocky hillside of Washington Heights, makes a striking foreground for the imposing buildings of the College of the City of New York.

GRANT'S TOMB AND THE SOLDIERS' AND SAILORS' MONUMENT

Of the many monuments in New York, the most beautiful is Washington Arch, which stands at the southern entrance of Washington Square, looking up Fifth Avenue, which makes its beginning here. On the Fifth Avenue side of the arch there are two statues, one of Washington as commander-in-chief of the army, the other of Washington as president.

Grant's Tomb, where General Grant and his wife lie buried, is far up on Riverside Drive at One Hundred and Twenty-fifth Street. It is a square, white granite building, in Greek style, as you may see from the picture on page 5428. Thousands of pilgrims come to see it every year, we might almost say every month. It stands on a noble site overlooking the Hudson, and the view of the river from the terrace is very fine. The Soldiers' and Sailors' Monument, on Riverside Drive at Eighty-ninth Street, was built to commemorate the soldiers and sailors of New York who fell in the Civil War. It is also in Greek style, and many people think it more beautiful than Grant's Tomb.

THE OLD LANDMARKS OF THE CITY

Although few memorials of the older life of New York have been left, a few still remain. Two of the most interesting are the old blockhouse forts, one in Central Park, overlooking One Hundred and Tenth Street, the other on the height of Morningside Park. The Jumel Mansion, which overlooks the Harlem River beyond the great viaduct, which crosses the valley at One Hundred and Fifty-fifth Street, was Washington's headquarters after his retreat from New York, and afterward the headquarters of the British army. The house is now a museum for Revolutionary relics and colonial furniture. On Convent Avenue, near the City College, you will find a frame house, which was once Alexander Hamilton's country place. It is now used as the rectory of St. Luke's Church, beside which it stands. Most interesting of all the relics of the old times is Fraunces' Tavern, down near Battery Park, on the corner of Broad and Beaver Streets, where Washington made his farewell speech to his officers, when, at the close of the Revolutionary War, he resigned command of the army that he had led to victory.

A FEW OF THE CITY CHURCHES

St. Paul's Church, where Washington attended service during his first term of office, is about half a mile away, up Broadway. St. Paul's is the only church in the city that stands as it did before the Revolution, and it was here that the President and the members of Congress came in solemn procession after the first inauguration. The pew in which he sat is preserved as it was in his time, and so is the pew used by Governor Clinton. General Montgomery was buried in the churchyard just beneath the west window, and his monument is divided from Broadway by only an iron railing and a narrow space. The churchyard is a quiet place, where hundreds of people go every day to rest.

Trinity Church, on Broadway at the head of Wall Street, is a fine brown stone church, built in the Gothic style of architecture. The marble altar is very beautiful. There are some fine windows in the church, and the bronze doors are worth careful study. Alexander Hamilton is buried in the beautiful little churchyard,

COOPER UNION AND GRACE CHURCH

Peter Cooper was a poor boy, who had few opportunities to get an education, but nevertheless made a large fortune. He established in New York City an institution known as Cooper Union, to help those like himself. In the building are night schools, an art school, a lecture hall, a library and the like. The statue of Cooper, before the entrance, is by St. Gaudens, of whom you may read elsewhere.

Grace Church is one of the most prominent churches in the city, and tries to reach every one. In the open pulpit, services are frequently held, and large crowds gather on the lawn to listen to the sermon. The church maintains an excellent school for its choir boys, and the choir is noted for its singing. The interior of the building, with its vaulted roof and fine pillars and carving, is especially beautiful.

Lower photograph by Paul Thompson, N.Y.

and so is Captain Lawrence of the Chesapeake, whose body was brought here from Halifax, where it was first laid.

There are many fine churches in New York, but the one that, after Trinity and St. Paul's, interests us most, is the Roman Catholic cathedral, St. Patrick's. St. Patrick's Church, which stands on Fifth Avenue, between Fifty-first and Fifty-second Streets, is without doubt the most beautiful church in the city, and probably in America. It is built of white marble, in what we call the Decorated Gothic style, the same style that was used in the building of the beautiful Rheims Cathedral. Whether one sees St. Patrick's on a sunny day, when its twin spires are outlined against a vividly blue sky, or in the misty light that makes Fifth Avenue most beautiful, or in a pouring rain, it always gives the feeling that it is not a building of stone alone, but a living thing, and makes us feel that the spirit of reverent work did not die with the old cathedral builders. Within sight of the cathedral, on the other side of the avenue, St. Thomas' Church, a gray stone building, copied from an earlier Gothic style, has a beautiful cloister at the side. Grace Church, on Broadway near Tenth Street, which is built in the same style as St. Patrick's, gives us something of the same feeling as the larger church. The inside of this church is particularly lovely, and it is much loved by the people of the city.

The Cathedral of St. John the Divine, the cathedral of the Protestant Episcopal Church, stands on a magnificent, cliff-like site, and overlooks a large part of the city. It has been in process of construction for over twenty years, but is not yet finished. Around the chancel are clustered seven chapels, called the Chapels of the Seven Tongues, in which services will be held in seven different languages. The Cathedral, with its choir school, the hall in which the Synod meets, the Bishop's residence and the Dean's house, with St. Luke's Hospital across the street, and the trees and lawns of Morningside Park below the heights on which they stand, make a splendid picture for the thousands of people who pass it every day on the elevated trains.

Some of the Treasures in the Metropolitan Museum of Art

There are two great museums in the city, the American Museum of Natural History and the Metropolitan Museum of Art. We have told the story of the Museum of Natural History in another place, but without writing a book about it, it is impossible to write the story of the Metropolitan Museum of Art. We can tell you, of course, that the museum is a gray stone building in Central Park, that it faces on Fifth Avenue, and that the picture gallery is one of the most important in the world, but that gives you no idea of the riches of beauty that it contains.

Within the museum there are great collections of porcelain, of pottery that goes back to the earliest time that pottery was made, of metal work and coins, of armor from the Middle Ages, of rugs and tapestries, exquisite laces and finest embroideries. If you are interested in the history of ancient Egypt, you can study it from objects that the people used, from pictures that they painted on their tombs, or from parts of the tombs themselves. If you are studying the history of music, you will find a collection of ancient instruments most interesting. There are casts of some of the greatest statues in the world, and models of some of the great buildings of which we have read in this book. Then there are the pictures. You can go through the picture galleries again and again and yet you will not know all the pictures that are in them. By and by you will have your favorites among them, to which you will make little pilgrimages each time that you go, and after a while you will carry these away in your mind, as truly your own as if they hung on the walls of your room. The museum is open every day, and especially on Sunday afternoons and on holidays, people throng about the halls.

The Public Library and Cooper Union

The last place of interest to which we shall take you in this great city is the Public Library on Fifth Avenue, the centre of the library system in New York. It is a three-story marble building, nearly two blocks in length, built in classic style. A broad flight of steps leads up to the portico over the grand entrance, where bronze doors open into the spacious, high-pillared great hall, and from this a wide flight of stairs leads up into an open gallery on the second floor. The halls are lined with gray marble, and here and there you will find marble

benches which might have come from some Roman villa. Within this great building there are a number of reading rooms, which are always filled with students, but the children's library will interest you most of all. This is a charming room, with a warm red brick floor, comfortable low chairs and tables, low bookshelves that any boy or girl can reach, and window-seats in which it is a delight to curl up and read.

This is the entrance to the United States Sub-Treasury on Wall Street. It stands on the site of Federal Hall, where our government was organized, April 30, 1789. This fine statue of Washington, by J. Q. A. Ward, stands on almost the same spot where he stood when taking the oath of office. This is now the busiest part of New York. Inside the building very important business is carried on.

It would interest you to go to some of the city schools, especially in the east side of the city, where many of the children speak English at school, and a foreign language to their parents at home, and gradually teach them to speak the English tongue.

One of the schools that would interest you very much is Cooper Union, an endowed school for the advancement of art and science. It was endowed in 1859 by Peter Cooper as a night school where science and art might be taught free to young people who have to work during the day. Many thousands of people owe their education in painting and designing, in sculpture, in science or mathematics to this famous school. Its night work was found so useful, that not very long ago an endowment was made for a day school also. There is a hall in the building where meetings are held, and many famous speeches have been made there by well-known men. Outside the hall there is a statue of Peter Cooper, the founder, made by Augustus St. Gaudens, who received his early training in the school.

Many miles of railways are needed to carry people from place to place within the city. Some of the railway lines are carried on great elevated structures, some run on the surface of the streets, and others are built underground.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 5327.

WHERE THE CROWDS GO

The Metropolitan Museum of Arts in Central Park, facing Fifth Avenue, is famous all over the world for its collection of pictures, porcelain, furniture, lace and many other precious things. The building is of gray granite, built in classical style, and covers several acres of ground. The picture gives a very good idea of its great length. Behind it in the park stands the obelisk of which you may read elsewhere.

Here is a picture of the Plaza at Fifty-ninth Street and Fifth Avenue. In the centre we see the beautiful statue of General Sherman by our well-known American sculptor, St. Gaudens. Central Park begins here, and on Sunday afternoons the Square is alive with people. Some of the most fashionable hotels in the city are grouped around the Plaza, and apartment rents range hereabouts into thousands of dollars.

WHY DOES A BALL BOUNCE?

CONTINUED FROM 4880

THERE are two kinds of balls which bounce—those which are solid, like a hard indiarubber ball or a golf-ball, and those which are hollow, like a tennis-ball, covered or uncovered. No matter whether a ball is solid or hollow, its bounce is due to the fact that it is what we call elastic. This simply means that when the ball is pressed out of its shape, it tends to return to the shape it had at first. It is this return to its original shape, or rebound, that makes the ball bounce.

We must not, however, think that only indiarubber is elastic. On the contrary, steel is much more elastic than indiarubber, and, as can easily be proved, steel balls bounce splendidly.

WHAT MAKES A BALL STOP BOUNCING?

Into almost every question we can ask, there comes, sooner or later, the greatest and deepest law of all science, which is that nothing is lost or created, and that everything has to be paid for. This law of the persistence of power applies to the movement of an atom or a star, a butterfly or a ball.

When the ball starts bouncing, it has a certain amount of motion in it, which is force, or power, or energy. When it stops, that has gone. Either we must show that the energy has gone somewhere and has not been destroyed, or, according to the great law of the persistence of power, the ball should bounce for ever. If it did not bounce for ever the law would be false. It is, however, quite easy to show that the ball does lose the power with which it started. To begin with, it is moving, both up and down, through the air, and forcing millions of particles of air aside every moment. All the motion it gives to them it loses.

If a ball were bounced in a space as far as possible emptied of air, it would bounce far longer than it does in the atmosphere, just as a top will spin longer in the same circumstances. Suppose that, instead of bouncing the ball on something hard, we bounce it on a pillow or on loose sand. It will not bounce long in such a case. Its power has gone in moving the pillow or the sand as well as the air. The ball itself, too, is not quite elastic, nor is the ground. If the ball and the ground were quite elastic and there were no air to move, and the ball never turned and rubbed the ground in falling, it would go on bouncing for ever.

WHY WILL NOT A BALL BOUNCE WHEN IT IS BURST?

In the case of a hollow ball, such as

a tennis-ball, which has a splendid bounce, it is not by any means the indiarubber only that explains why the ball is so elastic. The ball is filled with gas, or, rather, a mixture of several gases, which we call air. We can soon see how much this ball bounces if we compare an ordinary soft indiarubber ball with another one which has a small hole punched in it.

So far as the indiarubber is concerned, the two balls are practically the same, but their bounce is very different—unless we happen to bounce the second ball just on the place where the hole is. If we do not do this, the air is expelled from the hole when the ball is bounced, and we find that it bounces very little, because the elasticity of the ball is so poor. But the other ball bounces exceedingly well, because, when it is bounced, the air in it is not squeezed through any hole, and thus gives the ball its elastic rebound.

ARE THE KNOBS ON SEAWEED FILLED WITH AIR?

What we call air is a mixture of various gases, and any gas may be called "air." For instance, when carbon dioxide was found to come out of heated chalk it was called "fixed air"—the air, or gas, that had been fixed in the chalk. So we may, perhaps, give the name of air to that which we find filling the knobs on seaweed, and, like the air we know so well, it is certainly a mixture of gases, but it is not the same mixture as our atmosphere.

The question may be asked, How does this air get into the knobs of seaweed? A seaweed, like all other living things, must breathe. This means that it takes into itself, through its surface, some of the oxygen dissolved in the sea-water around it. It also produces carbon dioxide within itself, just as we do, though the whole process goes on very slowly indeed in the seaweed, as compared with ourselves. From the facts that have been mentioned we should therefore expect to find that the mixture of gases in the knobs on the seaweed shows that it is obtained partly from outside and is partly produced from within.

We must remember, also, that a piece of dead or dying seaweed, in surroundings unnatural to it, and exposed to the air and the sun, will undergo changes, and several of the compounds that make up its body will yield gases that may contribute to the contents of the knobs.

WHY DO OUR HEARTS BEAT SO MUCH WHEN WE ARE NERVOUS?

The answer to this question depends on our knowledge of one of the most interesting facts in the body. The beat of the heart goes on in consequence of the orders of certain nerve-cells that lie inside the heart itself. The brain, therefore, may be asleep or attending to something else, or poisoned, yet the heart will go on beating.

But as the beat of the heart decides the flow of the blood, the brain, which is the great master and controller of the body, must have some control over the heart. Certain special nerves therefore run down from the brain, through the neck on each side, to the heart. One pair of these nerves has the power of making the heart beat slower and weaker, and the other has the power of making the beat quicker and stronger.

When we are frightened, the brain sends certain orders down through these nerves, which have the effect of making the heart beat strongly and quickly. When something occurs to terrify a creature, the best thing it can do, as a rule, is to run away. Now, we run with our hearts far more than with our legs, and the real secret of this beautiful working of the body is that the increased force and speed of the heart-beat, when we are frightened, is the body's attempt to make provision for running.

WHY DO OUR HEARTS BEAT FASTER WHEN WE RUN?

When we run we are doing work, for we are moving a certain amount of matter —our bodies—at a certain speed through space. The power we spend has to come from somewhere, and, indeed, what happens is that large quantities of sugar and other things are quickly burned up in our muscles.

Among the results of their burning is the gas carbon dioxide, which, if it remains in the body, will do harm, not that it is poisonous in itself, but because it would crowd out oxygen, the gas necessary to maintain life. An important work of the blood is to carry carbon dioxide to the lungs.

If we examine the air coming from the lungs of a man who is running or doing hard work with his muscles, we find that there is, perhaps, ten times as much carbon dioxide in the breath he breathes out as there is when he is at rest. It is

quite evident that the first thing the body must do in such a case as this is to make the blood move as quickly as possible, both through the muscles and the lungs.

It must move quickly through the muscles, because they are using up a lot of oxygen, and because they are making a lot of carbon dioxide. The quick supply of blood is making a quick supply of air, and the extra beating of the heart is really very like the beating, as it might be called, of a pair of bellows when we want to drive an exceptionally quick supply of air into a fire. Also the blood must pass quickly through the lungs so as to get a lot of oxygen and lose its excess of carbon dioxide. Therefore, the heart beats quickly.

It has lately been found that when a man is "in training," as we say, he produces much less carbon dioxide when he runs than when he is not trained; and his pulse is not so much quickened. Thus, being in good condition means, among other things, that the body learns to be more economical in its comsumption of fuel than it used to be.

CAN WE TRAIN THE MEMORY?

The answer to this question depends upon what we mean by memory. What we call memory has really different parts. There is, first of all, the fact that something sticks somewhere in the brain. Then there is the fact that when it is brought to our notice again we recognize it—that is to say, we remember that we have seen it before. Then there is the power of recalling and bringing it up into our minds at will. These three things are very often put together in our minds, and we call them memory, but they are not all the same thing.

All the evidence we can get seems to show that the mere power of holding on to a thing cannot be improved by any kind of training. As for the power of recognizing, that depends on the amount of attention we gave in the first place. But the power of recalling things at will can be trained, because it depends upon the extent to which different things are connected in our minds. We are more likely to be able to bring up things, so to speak, from our memory if we have more ropes to hold them by. This is the only way of training the memory that is worth anything; and learning by heart, though it may be necessary for other purposes, is of no use for the purpose of recalling. The real way to learn to remember is to think. The more a thing is thought about, and connected up, as it were, with other things in the mind, the more certainly and easily shall we remember that thing when we want to.

CAN WE TEACH OURSELVES TO THINK?

Different people vary very greatly by nature in their inclination to think. A small number of people, sometimes with not very good minds, but sometimes such that they become the great thinkers of the world, are almost bound to think most of their time, whether about big or little things. Some of them cannot stop thinking even when they want to sleep. It was the greatest difficulty for Herbert Spencer, for instance, to prevent himself from thinking, and he had to use all sorts of devices to make his mind stop working for a little.

Most of us have the opposite difficulty, because very often at school we merely have our memory crammed and are not taught to think at all. But it is possible to learn the good habit of thinking, just as one can learn bad habits. We ought to set ourselves to ask the reasons of things, and also to read the right kinds of books, which are those that simply compel us to think, whether we want to or not. The time will come when the real education of the mind is seen to be learning to think. That is the great use of *facts* in real education—that we may turn them into *faculty*, the power of thinking.

WHY CAN WE THINK OF ONLY ONE THING AT A TIME?

If we mean thinking in the strict sense of steadily and purposely reasoning from one thing to another, then it is quite true that we cannot think of more than one thing at a time. The reason of this is that such thinking requires all our attention, and the brain is so made that close attention means running nearly all its power in one direction.

If, however, we are not thinking very hard, it is quite possible for other things to be passing through the mind at the same time. On the other hand, we all know that when we are very deeply interested in something, and give it all our attention, we may think so com-

pletely of the one thing alone that the particular part of our mind in the background which usually reminds us that we have something else to do may not be heard at all.

CAN WE EVER STOP THINKING?

As long as we are awake there is something going on in the mind which may or may not be thinking in the proper sense of the word, but which, if not thinking, is at any rate feeling and willing.

If we stop all thinking and feeling and willing, then we are no longer awake, but asleep. At least, that appears at first to be true. But when we carefully study what happens during sleep, we find reason to suppose that some parts of the brain are always more or less awake. So, if by thinking we mean simply being more or less awake, then the answer probably is that, from birth to death, this kind of thinking is, to a greater or less extent, going on all the time.

But the word thinking is best used to mean real thinking, putting two and two together, and really arguing from one thing to another, asking the why and wherefore, and trying to find out the answer. That is real thinking and the difficulty for most people is not how to stop it, but how to begin it, and how to keep it going on when it is begun. We make a very great mistake if we suppose that all the time we are awake we are thinking in this sense of the word.

WHY IS OUR RIGHT HAND STRONGER THAN OUR LEFT?

It is quite certain that the difference in *strength* between our hands is not natural, in the sense of being a thing decided from our birth, but is the result of the different treatment that our two hands have received since.

Difference in *skill* is another matter, as we read on page 2009. There is a simple instrument, meant to be squeezed in the hand, which measures the strength of the grip of the two hands, and it shows that the right hand is considerably stronger in right-handed people and the left hand in left-handed people. So that we should really have added to our question the words "if we are right-handed." These differences between the hands do not exist if we use the two hands equally. Some children are very carefully looked after, to see that they become what is called *ambidextrous*, using both hands alike, and their hands are equally strong.

We see, then, that it makes a great deal of difference to our muscles how much they are exercised. There is no doubt that the difference in the strength of the two hands depends on the size of the muscles, for a tape measure put around the two forearms, or even a pair of gloves put on, will often show the difference that use or exercise has made in the size of the hands.

It is true of every part and every power of our bodies that they can be improved by use. On the other hand, it is no less certain that, for every part and power of the body or the mind of everyone, there is a limit which, if we are wise and careful, we may reach, but beyond which we can never go.

WHAT MAKES A ROUGH SEA CALM WHEN OIL IS POURED UPON IT?

The explanation lies in one of the contrasts between oil and water, which we can readily observe for ourselves even when we have a small quantity of the two liquids in a couple of bottles. If we shake the bottle of oil, we notice how slow its movements are, and how difficult it is to make it splash. It is what we call a viscous liquid. Water moves much more easily, and we call it a mobile—that is movable—liquid. Oil calms troubled waters because it is so viscous. But it is very difficult to understand what it is that makes one liquid viscous and another mobile. Partly it has something to do with the size of the molecules of the liquid. In the case of oil of any kind, the molecules are very large.

CAN A FLY SEE ALL WAYS AT ONCE?

A fly cannot see quite in all directions at once, because, whatever the shape of its eyes, one part of them, at any rate, must lie against the fly's head, and in that direction, at least, the fly cannot see. But it is true that the eyes of flies, and of many other insects, can see in far more directions at once than ours can. This is especially the case where the eyes are not flat, but very much rounded and bulging.

We must not suppose that this means clear vision at one and the same time in all these directions; but it does mean that, while looking in one direction,

so to speak, the insect can get a hint of movements much farther round the corner than we can. The proper way of saying this is that their field of vision is very large, even though it does not quite amount to seeing "all ways at once."

In order that the eye shall be able to receive light coming from so many different directions, it is made somewhat like a precious stone that has been cut into many little faces, or facets. The number of these tiny, flat facets on the eyes of insects is extraordinary. A male ant, for instance, may have 1,200 facets on each eye, and the number on the eye of the dragon-fly has been reckoned as high as 17,000.

CAN FLIES HEAR?

The more we study the senses of different animals, the more do we learn that the sense of hearing ranks high in the scale, and comes late in the history of the progress of life; and thus we find that various creatures, whose powers of touch and of smell and of vision are marvelous, seem to be almost, or entirely, deaf. There are a few insects which can hear, but the greater number, including flies, cannot hear at all. Every imaginable kind of sound has been tried, and insects, with the exception of very few, take no notice whatever. Lord Avebury thought that perhaps insects might respond to sounds of so high a pitch that our ears cannot hear them, but he could not induce them to take any notice of sound.

The highest string of a violin has been scraped an inch away from bees engaged in pillaging flowers, and they have taken no notice whatever. The senses of insects, including flies, are so wonderful, and in some respects so superior to our own, that it is immensely interesting to find that nearly all insects, including not only the flies but the highest insects, such as the bees, the ants, and the wasps, are quite deaf.

WHY DOES THE POISON INSIDE THE WASP'S BODY NOT HURT IT?

This question would be interesting enough if it applied only to wasps, but it is really far more interesting, as we can ask just the same question about a large number of animals and plants that contain substances poisonous to creatures of other kinds, but not to themselves. For instance, why should a poisonous serpent, biting itself or another serpent of the same kind, do no harm, except just the harm caused by its teeth?

We are gradually coming to realize that the answer is to be found somewhere in the chemistry of life. The fact that different creatures differ from one another must mean, among other things, that each kind of creature has a chemistry peculiar to itself. That, of course, is the real explanation of the fact that one man's meat is another man's poison, that the wasp's poison is not poison to the wasp, nor the snake's poison to the snake.

Each kind of creature, then, has its own special chemistry. For the purposes of its own life it produces certain substances, useful as means of offence or defence. But it is in the very nature of the case that no kind of living thing could produce and retain substances poisonous to itself and continue to exist.

WHY DOES THE TRUMPET ON AN OLD-FASHIONED PHONOGRAPH MAKE SOUND LOUDER?

We may ask this same question in many forms. For instance, why does a sounding-board over a pulpit make the preacher's voice louder? Why does opening the lid of a grand piano make the sound louder, especially on the side that the open lid is facing? Why does a singer's voice sound louder when he keeps his tongue low in the floor of his mouth?

In all these cases we see the same principle at work, and similar instances might be quoted from the case of light, as when we place a concave mirror behind the light in a magic-lantern, or have a complicated arrangement of mirrors behind the lamp of a lighthouse.

What happens is that the sound—or the light—is reflected in the direction we wish. When a sound is made anywhere, the law is that the waves spread out equally in all directions at the same speed and with the same power. But sound can be reflected exactly like light, and if we desire it to be heard especially well at any point, we must arrange to reflect it towards that point. We cannot make the sound louder than it is, but we can get more of it to reach the place that we desire.

This applies equally well, whether the sound is coming or going. We may put

a trumpet on the phonograph, or we may use a speaking-trumpet for our own voices, if we want to speak at sea or to a large company in the open air. Or, on the other hand, we may put the trumpet in our ears, as deaf people do, where it acts in just the same way, reflecting towards the canal of the ear a certain amount of sound which would not otherwise have reached it. Our own ears act as reflectors of this kind in a smaller degree.

The making of echoes by walls is really just the same as the action of a trumpet; only when the wall is far away the reflected sound comes so long after the first sound that we hear two sounds. Walls help a speaker if they are close beside or behind him, but not otherwise.

WHY WERE KINGS IN THE OLD DAYS SO CRUEL AND HARD?

Kings are naturally very much like other people—that is to say, when a little boy is born to a king and queen, he may be likely to grow up kind-hearted or cruel-hearted, or somewhere in between, just as other people may. And there certainly have been many kind-hearted kings, but there are various reasons why the records of history are full of the names of cruel kings.

For one thing, there is always more to say about cruelty and wickedness than there is about kindness and goodness. The newspapers of to-day give a very wrong idea of the proportions of good and evil in the world, and history books also tend to give a wrong idea in this respect.

Again, almost the only way in which, in times gone by, a king could keep his throne was by being merciless. Young kings, who had any tenderness in them, and hesitated to kill their enemies, were soon killed or dethroned themselves. Where power extends to ruthlessness and cruelty, we shall not expect mercy and kindness long enthroned.

But now kings know that their only "divine right" is the divine right to be kingly men, which we all have, and that the old days are gone forever.

ARE NEW CLOUDS ALWAYS BEING MADE?

Clouds are always being made and unmade. No cloud lasts for more than a short time, and the surface of a cloud all round is constantly changing. The making and unmaking of clouds depend, from moment to moment, upon a great many different conditions in the air; for instance, the temperature of the air, the amount of moisture it contains, the nature and temperature of winds, the amount of dust in the air, and the state of the electricity in the air at the time.

These things are changing from moment to moment; indeed, it is not possible that they can all remain the same for two moments together. The earth never ceases to spin, and this means that different parts of the air are being brought under the rays of the sun or out of them. Even though the sun is shining on parts of the air for many hours at a time, the spinning of the earth makes it shine at a different angle, which alters the force of its rays. As the sun shines it warms the air, and so increases the amount of water which it can hold in the form of transparent water-vapor rather than in the form of clouds.

So clouds are always being made and melted here and there, as no one needs telling who has been able to spare time to watch the face of the sky steadily and carefully for even a short period.

WHY WILL NOT WATER BURN AS OIL DOES?

There are some oils and some spirits, which have the appearance of water to the eye, that burn. So we can understand that it was a great puzzle for many centuries why one fluid should put out a lighted match applied to it, and another should promptly burst into flame.

We now know the answer perfectly, but less than a hundred and fifty years ago the united wisdom and knowledge of all mankind had no key to it. That was because men did not know what burning was, and until we understand the nature of combustion, or burning, of course we cannot explain the differences in various cases.

We now know that burning is the chemical union of some other elements with oxygen. The other elements are able to take up a certain amount of oxygen, and no more. When they have taken up all they can, they are completely burned, and will not burn any more. Water will not burn because it is already burned; it is the result of burning hydrogen with oxygen. Oil and spirits burn because they contain a large quantity of atoms which can combine with oxygen, and have not yet done so.

In all oils and spirits these atoms are of only two kinds, atoms of carbon and atoms of hydrogen. But, as it happens, both of these are intensely fond of oxygen, and are therefore very good fuels. If we could carefully examine the gases which are given off from the lamp or the candle, we should find that they principally consist of carbon dioxide and water in the form of a gas—the products of the burning of carbon and hydrogen.

WHAT BECOMES OF THE OIL THAT IS BURNED IN LAMPS?

Oil is usually a mixture of a large number of compounds, all of which contain a great deal of carbon and hydrogen. These are the principal elements in oil, though a certain amount of oxygen is often there too. Carbon and hydrogen are both able and willing to combine very readily and firmly with oxygen, and there is always far less oxygen already combined with them in the compounds that make up oil than they are able to combine with.

Every atom of carbon desires two of oxygen to form carbon dioxide, CO_2, as chemists call it, and every two atoms of hydrogen desire one atom of oxygen to form water, H_2O. If the temperature is warm enough, and oxygen is present, the oil will therefore be oxidized, as we say, until all the carbon and hydrogen in it have combined with all the oxygen they require—in the proportions we have just noted.

The answer to the question, therefore, is that the oil disappears, not because anything is destroyed, but because it is combined with the oxygen to form carbon dioxide and water. At the temperature of the lamp both of these compounds can exist only in the gaseous form, and that is why it is difficult for us to realize that water is being made and poured into the air from a lamp, a candle, or a gas-jet all the time it is burning.

IS IT TRUE THAT OIL STILL EXISTS AFTER IT HAS BEEN BURNED?

It is most important for all our ideas of chemistry to be able to prove that all the carbon and hydrogen of the oil are contained in the products of its burning; and the proof that this is so, and that therefore not one atom of the oil is destroyed, though it all disappears, was one of the great discoveries in the history of knowledge made at the end of the eighteenth century. We must weigh the oil, burn it in an enclosed place, collect all the water that is formed, gather all the carbon dioxide by passing it through something that absorbs it, and then weigh them all together. We know how much oxygen is in a given weight of either of these substances, and, allowing for it, we can prove that all the stuff of the oil is still there, though it is so changed.

OF WHAT IS THE SUN MADE?

Not very many years have passed since it was said that this was a question to which no answer could be made. At that time no one had guessed the wonderful fact that, by holding up a prism to sunlight, and noting what the light looked like after it had come through the prism, we should be able to tell exactly and positively what chemical elements must be in the sun at the places where the light has come from.

Of course, it might be that when the light was studied in this way it gave us evidence of the presence in the sun of certain things quite different from the elements we know upon the earth. But the great and never-to-be-forgotten fact is that what we find is clear evidence that the sun is made of the same familiar elements that go to make up the earth and our own bodies—elements like carbon, oxygen, hydrogen, magnesium, calcium, and iron, besides many others.

DO WE KNOW ANY KIND OF MATTER NOT FOUND ON THE EARTH?

There is one element known to exist in sunlight which is unknown upon the earth. One of these was found in that outer part of the sun which is called the corona, or crown, and the name *coronium* was therefore given to this element. It has not been found anywhere on the earth.

Another element was found in the sun, and was given the name of *helium*, after the Greek name for the sun, but in this case, a number of years later, this very element, which was first found in the sun, was discovered in a rare mineral on the earth; and now we know that it is also being constantly produced from the element radium. In the same way we are able to tell by the light of the stars of what those distant bodies are made, as shown on pages 2740 and 2741.

WHY IS A RIVER ALWAYS MOVING?

The water of a river, like everything else upon the surface of the earth, is always being pulled as near as possible to the centre of the earth by gravitation.

Even when a river or a stream is rushing fast downwards it still stays upon the surface; but we must remember that the new part of the surface that it reaches is nearer the earth's centre. When anything falls towards the centre of the earth it loses some energy which it had in it before it fell, and we must ask where the water got this energy—the energy which, for instance, will turn a mill-wheel.

In other words, what raised the water in the first place, and never fails to raise more water? It is the sun. And so the answer to our question, "Why is a river always moving?" is really: "Because the sun is always shining." The sun's power raised from the sea the water that falls as rain, and makes rivers. Therefore it is really the sun that turns the mill-wheel, and it is also the sun that opposes us when we try to swim or row up-stream.

WHAT KEEPS THE AIR ROUND THE EARTH?

There is nothing whatever but gravitation to keep the air round the earth, and there are many things at work to make the air leave the earth. As the earth sweeps through space in its curved path, every part of it is always tending to move straight on instead of round the sun. And as the earth spins upon itself, the atoms of the air tend to be thrown off like the raindrops from a spinning umbrella. And if the movement of the atoms or molecules of gases in the air becomes quicker than a certain rate, they will fly off into space. There is almost certainly a leakage going on all the time, so that, in fact, the air is not being completely kept round the earth.

If the earth were smaller, it would not be able to hold round itself so dense an atmosphere as it does, and it would lose its atmosphere more quickly.

This is probably what has happened in the case of Mars, which is older than the earth and smaller, so that it has had more time for its air to leak away, and less power to keep it. So Mars has only a very thin atmosphere. And the moon, which is too small altogether to hold it, has now no atmosphere at all around it.

WHY CANNOT WE SEE THE SPOKES OF A WHEEL WHEN IT GOES VERY FAST?

The reason is that the marks made, so to speak, by anything upon the retina, or curtain, at the back of the eye do not instantly fade away, but last for a small fraction of a second. The real marvel here is that these images on the retina last for such a short time, and that it is so quickly ready to receive new ones. Still, the images do last for a little while, and if a wheel goes round at all quickly, the marks made by the spokes at the different parts of their journey run into each other, and we see no distinct spokes at all, but only a faint blur inside the circle of the wheel.

The first answer to this question that would naturally suggest itself to our minds is, that the spokes of the wheel cannot be seen when it turns quickly because they are moving too fast for the eye to catch. That, however, is not the case at all, and a simple experiment will show that the first explanation is the true one, and not this, likely though it sounds. If we set a wheel spinning in darkness, and then have a single flash of electric light just for an instant, we catch a glimpse of the spokes of the wheel all seeming fixed in one place, as if the wheel were not moving at all.

WHAT WOULD HAPPEN IF THERE WERE NO FORGIVENESS IN THE WORLD?

The greatest of all facts about men and women is that we are social beings. This is one of the deepest roots in our character. The person who desires to live entirely away from all his fellows, however good his motive, has in him something that is unnatural and unhealthy. All the facts of human life depend upon this fact that we are social; not merely that we enjoy each other's company, but that, as the Bible says, "no man liveth to himself."

But though this is true, the fact remains that each of us is still himself or herself, and no one else; and that our interests are often different from those of other people, and so offence must come in the world. If our offences, small and great, against each other were never forgiven, it might be possible, perhaps, to have some rude and simple kind of society—stern and cruel; but it would certainly be impossible for mankind to rise above that humble level

THE NEXT QUESTIONS ARE ON PAGE 5173.

The first picture shows the "bully" at the start of the game; on the right we see a tussle for the ball.

HOCKEY FOR BOYS AND GIRLS

CONTINUED FROM 4931

THE HOLD FOR A "BULLY"

HOCKEY is a splendid winter game for both boys and girls, and it can be played in any level field of a good size. A full-sized hockey-ground should be 100 yards long, and from 55 to 60 yards broad; but a smaller ground, about 80 yards by 50, is quite big enough for young players. The game lasts seventy minutes, the players changing over at half-time. In Canada, hockey is usually played on ice, and the game is different. In the United States both games are played.

In the centre of each end-line stands the goal, which consists of two posts seven feet high and two inches square, set four yards apart and joined together at the top by a horizontal crossbar with square edges. For match play a net is attached to the posts and crossbar, and fastened to the ground behind. In front of each goal a "striking circle" must be marked out, and no goal can be scored unless the ball is hit through the posts from inside this "circle." It is made by drawing a white line, four yards long, parallel to the mouth of the goal and fifteen yards away from it, and continuing this each way as far as the goal-line by drawing two quarter-circles, having the two goal-posts as their centres. The lines themselves count as part of the striking circle.

A hockey-ball is a cricket-ball painted white, or made of white leather. A hockey-stick must be made of wood, and must have a flat surface on its left side only and be of such size that it can be passed through a two-inch ring. It must have no metal fittings, and must not weigh more than 28 ounces.

For a match each team consists of eleven players. The object of the game is to put the ball through our opponents' goal as often as possible, and to prevent them from scoring. A team is generally divided into five forwards, three half-backs, two backs, and a goal-keeper. The diagram on page 5029 shows the position to be taken up by each player before beginning to play.

We may dribble the ball, or hit it, or pass it to another player with the stick; and this matter of passing is very important indeed, because, in hockey, combination is the secret of success, and one selfish or unskilful player may spoil the chances of his side and thus lose the game.

The forwards must be swift runners, able to dribble and dodge and shoot, and to hit a ball from a pass without first stopping it dead. The half-backs must help the attack by constantly feeding their forwards with the ball.

The backs must be strong and plucky players, able to hit hard and straight, to stop hard hits and tackle rushes.

The goalkeeper is the last line of defence; his duty is to prevent the ball from passing between the posts, and to send it away from the neighborhood of the goal. He may kick the ball when he is inside his own striking circle. If there is no goalkeeper, one other player may be chosen who will have the right to kick the ball.

The game is started by the two rival centre-forwards "bullying off" in the middle of the centre-line, while the rest of the players must stand nearer their own goal-lines than the ball is. To bully off, each of the two centre-forwards, both standing squarely opposite each other and facing the side-lines, must first strike the ground on his own side of the ball, and then his opponent's stick over the ball, three times alternately. Either may then strike the ball independently, thus putting it into play. This central bully also takes

HOW TO PLAY THE GAME OF HOCKEY

The first picture shows a useful back-hand stroke to play when in difficulties. The stick is turned round so as to strike the ball with the flat side. In the second picture we see the correct position for rolling in the ball, when it has gone over the touch-line. The roller-in must stand outside the field of play. Good dribbling is most important in hockey. The ball is hit gently forward, again and again, by the player as she runs forward.

This player is stopping the ball in mid-air; she must not hold the ball, but must drop it and hit it at once.

By crossing her leg over that of the player behind her, the player in front is fouling. No player must strike or hook an opponent's person, or run between her and the ball.

The ball can be stopped dead with the foot, as the girl in this picture is doing, with the hand, or with any part of the body.

The player on the left has passed all her opponents but one, and is now about to try to hit the ball past the goalkeeper, who stands to the right, and into the goal, which can be seen in the picture.

In this picture a goal has just been scored. The ball has been hit past the defending goalkeeper and through the goal from a spot within the striking circle, which is necessary if the goal is to count.

place after half-time and whenever a goal has been scored. A goal is scored when the ball passes entirely over the part of the goal-line between the posts, after being hit by, or having glanced off, the stick of an attacker who is inside the striking circle.

We may catch the ball when it is in play, but must immediately let it fall straight down to the ground. We may also stop it dead with the feet or with any part of the body. It is against the rules to raise any part of the stick above the shoulder while striking the ball; to touch the ball with the back of the stick, or to fence or hook sticks with any opponent who is not within striking distance of the ball, or to strike or hook an opponent's person; to charge, kick, collar, or trip up an opponent; to obstruct an opponent by running between him and the ball, or to touch him when running across him from the left, unless we touch the ball first; to pick up, carry, or kick the ball, or to knock it forward or backward except with the stick. The following are the penalties exacted for breaking any of the above rules.

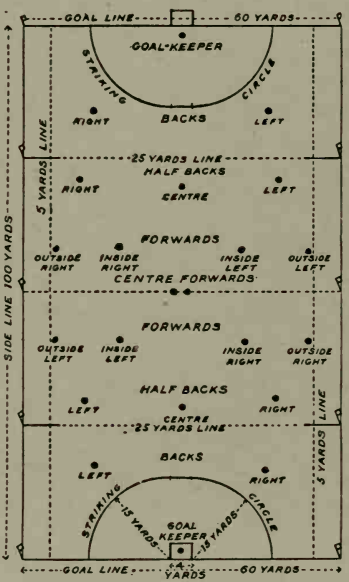
If the offence is committed by either side outside the striking circle, or by the attacking side within their opponents' striking circle, a "free hit" is given. While this is being taken, none of the offender's side are allowed to come within five yards of the ball, and the player who takes the free hit may not play the ball again until it has been touched by another player; if he does, a free hit is given to the other side. If the offence is committed by the defending side within their own striking circle, "off-side" is punished with a free hit on the spot, and the other offences with a "penalty bully." If the rules for the penalty bully are broken, the penalty bully is taken over again; if the rules for the free hit are broken by the defenders inside their own circle, a "penalty corner" is given.

When a player sends the ball right over the side-line, it must be "rolled in" by one of the opposite side. The "roller-in" must stand at the point where the ball crossed the side-line, and, with his stick and both feet outside the line, roll the ball along the ground, otherwise it is a "foul throw." He may send it in any direction and to any distance he likes. The moment the ball leaves the hand, it is in play, but until that moment all the other players must stand at least five yards from the side-line.

When a player of one team is "rolling in" or hitting the ball, any player of the same team who is at that moment nearer the opponents' goal-line than the striker or roller-in is off-side, if there are not at least three opponents between him and the enemy's goal-line. He may not take any part in the game at all until the ball has been touched or hit by an opponent. But we cannot be off-side in our own half of the ground, or if the ball was last touched or hit either by an opponent or by one of our own side who, at the time of hitting, is nearer our opponents' goal-line than we are.

During the game, if the ball is unintentionally sent behind the goal-line by one of the defending team who happens to be within the 25-yards line, the umpire must give a "corner" hit to the attacking team; or he may give a penalty corner.

For an ordinary corner all the members of the defending team must stand behind their own goal-line; the attacking team stand outside the striking circle in the field of play. One of the attacking team then takes a hit from any point on the goal-line or side-line within three yards of the nearest corner flag. No player is allowed to stand within five yards of the striker while the corner hit is being taken, and no goal can be scored from a corner hit unless the ball has first either been stopped motionless on the ground by one of the attacking side, or has touched the stick or the person of one of the players on the defending side. The player who takes the corner hit cannot touch the ball again until it has been hit by another player. When a penalty corner has been awarded, one of the attacking team takes a hit from any part of the goal-line not less than ten yards from the nearest goal-post. All other players stand as for an ordinary corner. The moment the corner or the penalty corner has been taken and the ball is put into play, the defenders rush forward to defend their goal-line. A free hit is taken from the spot where the offence took place. No other player may stand within five yards of the striker, who, after he has taken the hit, must not touch the ball again until some other player has touched it.



Hockey-field and position of players

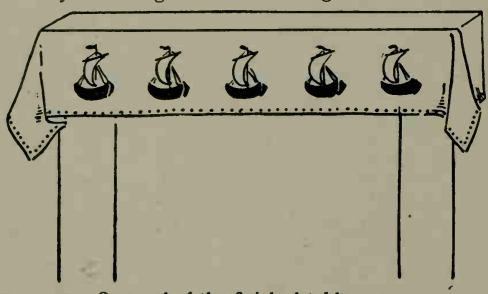
A penalty bully is played on the spot where the rule was broken, by the player who has broken the rule and some member of the opposing team. All other players must keep beyond the nearer 25-yards line in the field of play.

If during a penalty bully either player sends the ball over the goal-line between the posts, it then counts a goal to the attackers. If the offender sends the ball behind any part of his own goal-line outside the goal-posts, the bully must be taken again. If either of the players sends the ball outside the striking circle, the game has to be restarted by an ordinary bully on the centre of the nearest 25-yards line; the same must also be done if, in the penalty bully, the attacker happens to send the ball over the goal-line outside the goal-posts.

A TABLE-COVER IN APPLIQUÉ WORK

APPLIQUÉ work is the application of one material to another. It is one of the many different ways of working used in embroidery, and is an excellent method of introducing a fine big piece of color into a pattern without all the labor which would be required if we tried to cover the same space with stitches placed very close together.

We are going to make a table-cover of linen, and decorate it with appliqué in colors. First we must get a yard and a half of cream linen for making the table-cover itself, and also a quarter of a yard of green material, and a quarter of a yard of brown linen for the appliqué work. We are going to make a little border of boats with sails up all along our table-cover, as shown in picture 1, and each will have a brown sail and a green hull.



1. One end of the finished table-cover.

We must get a cinnamon-color brown, not a chocolate shade, and a pretty, soft green like a new leaf. We are going to cut out the shapes of the sails and boats from the green and brown linen, and sew them down to the cream ground with embroidery silk.

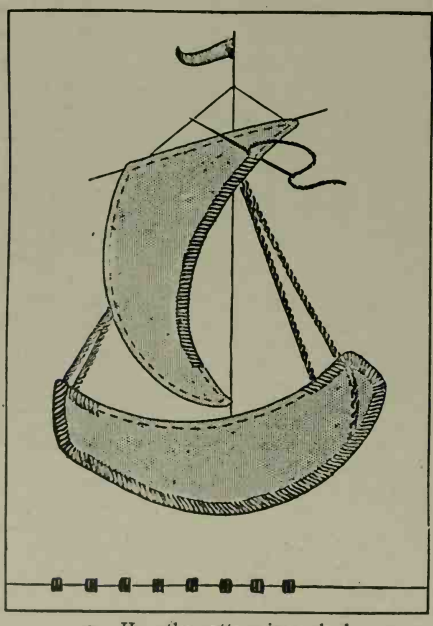
The first thing to do is to cut our cream linen into a piece which will fit the table or stand, leaving a piece twelve inches long to hang down around the four sides. This must be neatly hemmed to an inch-wide hem all round with a small needle and No. 60 white cotton. The hemming stitches must on no account show on the front.

It is on this part which hangs down that the embroidery is to be done. You may, if you like, carry out the idea of the appliqué design on cushions for a window-seat. Make the pillow-covers of the same material as the table-covers, and also make the window curtains to harmonize in color and pattern with the other.

The next thing which we have to do is to copy on paper the sail and boat shapes twice the size of those shown in picture 2. This is to be used as a pattern for cutting out the colored linen.

Five little ships will be enough for each side of the table-cover, one in the middle and two at equal distances each side, a few inches apart—say, three inches for a small border and four or five for a long one. They must be placed about two inches above the hem. First of all, iron out the brown and green linen quite flat, and cut from the pattern, *very neatly*, five little brown sails and five little green boats. We must use sharp scissors, and take care not to fray the edges of the linen. Placing the centre boat in position, as seen in picture 1, we fix it with a pin, while we tack it down with a needle and cotton all round a little way from the edge. We should next fix the sail in the same way, keeping it flat and avoiding puckers. Now we have one complete boat ready for working. The embroidery is done with floss silk, costing only a few cents per skein. We should get brown and green silks to match the linen, using the *brown* silk to edge the *green* linen, and the *green* silk to edge the *brown* linen.

The edging stitch is done as shown in picture 2—simply "over and over," very close together so as not to show any of the edge of the appliqué. We must keep it very neat, and the same width all the way round—that is, about one-sixth of an inch. The appliqué must not be puckered or moved in any way; but this will not be likely to happen if we have tacked it down firmly at first. When both the sail and hull are fixed and fastened by the silk border, we can get a ruler and pencil and draw in on the cream ground the mast-lines shown in the picture; a B B pencil shows up quite sufficiently for working purposes. Then embroider over the pencil-lines in brown silk, using an ordinary crewel-stitch, worked very neatly with the stitches set quite close to one another, and taking care to put each new stitch in exactly where the last one came out. This is the whole secret of keeping a perfectly straight line when using a single stitch. Crewel-stitch is not worked along the material like hemming, but upwards, as we can see by picture 4. We must knot the thread, and, starting from the back of the material at the bottom of the line we are going to embroider, make a stitch one-sixth of an inch long, by pushing the needle through from the front to the back again, bringing it up in the centre of this stitch. Then make



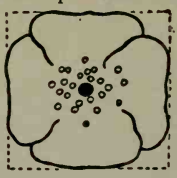
2. How the pattern is worked.

another stitch the same length, still keeping on the pattern line, and bring the needle up again where the first stitch left off.

The flag is so simple in shape that we should have no difficulty whatever in copying it in freehand from the picture, and drawing it on the linen in pencil. It must be neatly worked in scarlet silk, and should not merely be outlined, but filled completely in.

The little line which shows the prow of the boat is quite simple to draw. We notice that it curves just a little in the middle. It is worked over exactly as the mast-lines are done. When the design is all complete, we should give it a final pressing with a warm iron by laying it face downwards on a piece of flannel, and pressing it well on the *wrong* side.

Appliqué makes an excellent decoration for curtains, table-runners, and so on. For instance, a handsome pair of dark green curtains could be effectively decorated with a border of poppies, each cut out of scarlet linen, and sewn down with black wool. The centers and stamens of the flowers are also embroidered in black. Each poppy would be about seven inches across, and the flowers should be arranged in a straight line right across the bottom of the curtain—about twenty inches from the hem.



3. The poppy pattern.

Each poppy should just touch the other, and together they form a particularly pretty border. Picture 3 shows one of the poppies, in case we care to try to do a curtain or a table-cover.

For the table-cover, which is shown in picture 1, the poppies would be used as a border all round, and in either case we must make an enlarged drawing for a pattern. Notice that the poppy itself just fits a square; this will help us to draw it easily and correctly.

4. Crewel-stitch.

As a finish to the table-cover, a line of dots, each one made of three stitches close together, should go all along the edge, as shown in picture 1. This form of decoration would also suit the table-runner. We can see how the dots are done in picture 2. The thread between the sets of dots should not be cut off, but carried on from one to the other. You may use the ship design or the poppy pattern, or if you prefer you may make up your own pattern.

THE PUZZLE OF THE KING'S GUARD

A CERTAIN king was staying at one of his hunting lodges in the forest, and in this house there were nine rooms. The king slept in the central room, and arranged that the twenty-four soldiers who formed his guard should be so stationed that there should be nine on each side of the lodge. They were placed as in the diagram—three in each room. The king's stay was longer than he had originally intended, and the soldiers asked if they might meet on different evenings in one another's rooms, for games and conversation. This the king agreed to, but on the condition that there should always be nine on each side of the house. Before retiring to rest on the night that this new arrangement was made, the monarch thought he would go round the lodge, and count the soldiers on each side, to see that his orders were being obeyed, and to be sure that none of the soldiers had gone down to the village close by, or had allowed any strangers to visit them in the lodge. He looked carefully round and found that there were just nine on each side of the house, and so he went to rest feeling that none of his men were absent.

The king and his guard.

And yet, all the time, four of them had gone to the village, and were not in the house. How had the men contrived with four of their number away to maintain the full number of nine on each side of the lodge? The next night instead of any of the soldiers going to the village, four of the villagers who were friends of theirs came to the hunting lodge, and were let in, which was against the rules. But when the king looked round, he thought all was right because there were still nine men, and nine only, on each side. How was this? On the third night, eight visitors came in, and now there were thirty-two men in the house, but as the king still found nine on each side, he did not notice the new additions. The soldiers so enjoyed the visits of their friends that on the next night they invited twelve of their friends, and now they found it difficult to know how to arrange the whole of the thirty-six individuals, so that there would be nine, and no more than nine on each side of the house. But at last they did this, and thus deceived the king. On the fifth night, instead of inviting their friends to visit the king's lodge, eighteen of the soldiers remained behind, and contrived to so arrange themselves that there should be nine men on each side of the house, while the other six soldiers went away to the village.

How did the men manage to deceive the king on these five nights, and keep the same number of men on each side of the lodge, although the number of individuals in the house varied so greatly? The solution to this interesting puzzle is given on page 5133.

WHAT TO DO IN MANY KINDS OF ACCIDENTS

A SEVENTH LESSON IN FIRST AID TO THE INJURED

THERE are many kinds of accidents in which it is important that efficient aid should be rendered instantly.

Among such accidents are burns and scalds. Scalds are caused by moist heat, and the most common cause is steam or boiling water, though other liquids, such as hot oil and so on, may also cause severe scalds. Burns, on the other hand, are the result of dry heat, and may be caused by fire itself, by hot iron, by friction, as when we touch a quickly revolving wheel, and by acids, such as oil of vitriol, or alkalis, such as quicklime, coming in contact with the skin.

The first thing to do in case of an accident of this kind is to remove all the clothing which is near the wound. If it adheres to the wound, then it must be cut away carefully all round, but on no account must we pull away anything that is sticking to the flesh. We must, if oil is available, saturate the adhering pieces with the oil, so that later on they may come away.

DRESSING BURNS AND SCALDS

The great necessity in cases of burns and scalds is to get the wound covered up quickly, so that it may not be exposed to the air. This is of supreme importance, and while one person is cutting away the clothing, others should, if possible, prepare dressings to put over the wound. Pieces of gauze or linen must be saturated with oil, or smeared thickly with vaseline or cold cream, and laid upon the wound at once. Then cotton-wool or flannel should be placed over these dressings and bandaged lightly. Where the wound is very large, we shall find that it is easiest to put on the oiled lint or linen in strips, not in one large piece.

Should no oil or ointment be available, we should shake thickly over the wound fullers' earth, or powdered whiting, or flour, or starch powder, seeing, of course, that the powder is quite clean. If even these cannot be obtained quickly, the inside of a raw potato may be scraped fine and applied upon the gauze or linen.

If there is any delay in getting the necessary materials for dressings, the injured part should, when possible, be placed in water at the same temperature as the body, that is about 98 degrees. The treatment is the same no matter what part of the body may be injured in this way, but if it be the face, we shall find it an excellent plan to cut out of the gauze or linen a kind of mask with holes for the eyes, nose, and mouth, and then to oil this mask and put it on the injured person.

Having dressed the wound, we treat the patient for shock. We lay him on his back, with his head lower than his feet, and see that he has plenty of fresh air freely circulating round him. If the accident has happened in the street, the crowd must be kept back. Smelling salts should be held to the nose, and, if possible, a dose of sal volatile and water given. The patient must be kept warm. Cover him up well, put a hot water bottle to the feet if possible, and give some hot drink, such as warm milk or coffee, adding plenty of sugar, as sugar increases the temperature of the body.

BURNS CAUSED BY ACIDS

The treatment that has been described is for all kinds of burns and scalds. But in the case of burns caused by acids and alkalis, before applying the oiled bandage, something else has to be done first. If the burn has been caused by an alkali, such as quicklime or ammonia, we first of all bathe the part with a weak acid, such as vinegar and water mixed in equal quantities, or lemon-juice and water similarly mixed. On the other hand, if the wound was caused by an acid, then we bathe with a weak alkaline solution, such as washing soda, magnesia, or bicarbonate of soda mixed with warm water. Then after bathing in this way we can apply the dressings as already described.

If anyone sets light to his or her clothing, the person should be at once laid flat on the ground with the burning part uppermost, and then the flames should be smothered with a rug, tablecloth, mat, blanket, sack, or any similar large cloth. If this can be made wet without any delay, it will, of course, put out the fire most effectively. A girl helping to put out the flames of another's clothing should hold a rug or mat in front to protect herself. If we catch fire ourselves when no one is near, we must at once lie flat upon the ground, with the flames uppermost, and smother them with anything that is handy. We must on no account run about, especially in the open air.

FROSTBITE

At the opposite extreme from a burn or scald is a frostbite. The intense cold stops the circulation of the blood, the part affected becomes red, then white, and then purple, and a numbness sets in. The best remedy for frostbite is to use cold applications. Plunge the frozen part into very cold water, or rub with crushed ice for several minutes. Then gently massage with warm hands. The object is to let the blood flow slowly into the tissues and prevent the parts from becoming gangrenous. The patient must on no account be brought before a fire or into a very warm room until the circulation has been restored by continued rubbing of the frostbitten part. If snow is available the part should be rubbed with snow. When the circulation of the blood is restored, the frostbitten part should be wrapped in cotton and warm food given to the patient, who should be kept in a cool room.

SHOCK

In learning earlier in this lesson what to do in cases of burns and scalds, we also saw how we should treat a patient for shock. This is the treatment generally given for any kind of shock and also for fainting. The cause

of the shock of fainting must, of course, be removed.

For instance, if it is due to loss of blood, the bleeding must be stopped in the proper way; if it is due to lack of food, nourishment must be given, but this must be done very carefully and very slowly at first. If the breathing cannot be noticed, then respiration must be restored as in cases of drowning, which we shall learn later.

STINGS AND BITES

In the country, people are often stung by bees and wasps, and we may try to do something to alleviate the pain, though nothing is likely to be of much assistance. We first of all remove the sting if possible. This is done by pressing over the place where it is the mouth of a watch-key, thus squeezing it partly out. Then we can pull it out. But whether we can extract it or not, we bathe the part with weak ammonia and water, or a weak solution of washing soda, or with an antiseptic solution. Then, if the sting is very bad, we put a strip of gauze dipped in the solution upon the stung part and apply a wet dressing. If the patient has been stung so badly as to be in a state of collapse, we treat him for shock in the way described, earlier in this lesson. For bad nettle stings, we apply the same treatment.

In case of a bite from an adder or a dog or other animal, we must press with finger and thumb on the side of the wound nearest the heart, while someone else, as speedily as possible, ties a tape or string tightly round the limb to hinder the circulation of the blood, and thus prevent the poison from spreading. It is well to allow the wound to bleed a little. It must be bathed with warm water, and the best sponge is a piece of clean cotton-wool. A doctor should see the wound as soon as possible.

POISONING

Cases of poisoning must be treated at once, as life very often depends upon the promptness of the aid rendered.

Poisonous acids, like oxalic acid, spirits of salt, and so on, and poisonous alkalis, like ammonia, caustic soda, and so on, burn and stain the mouth. When the poison is an acid, we wash the patient's mouth out with an alkaline mixture, such as soda-water, chalk and water, or magnesia and water. If the poison is an alkali, we wash out the patient's mouth with an acid solution, such as vinegar and water, or lemon-juice. Then, whether it be acid or alkali that has caused the poisoning, we give the patient oil—salad oil or cod-liver oil.

In all other cases of poisoning than those caused by acids or alkalis, the patient must be treated in the following method. First of all an emetic must be given to make him throw up the poison. This should be made of two teaspoonsful of mustard or a tablespoonful of salt in a tumbler of warm water, either of which form an excellent emetic. The back of the patient's throat may also be tickled with a feather or some other similar object, as this will assist the emetic.

If the patient retains his senses, he should have some milk or a raw egg beaten up in some milk, either before or after the emetic. If the throat is swollen, hot flannels or poultices should be applied to the front of the neck, and cold water should be sipped constantly. Should the patient show any signs of sleepiness, keep him awake by making him walk up and down the room, or flick the face and neck with a towel. Strong coffee without milk is a very good thing to give. If breathing cannot be noticed, artificial respiration must be applied.

These are the general rules in cases of poisoning, but there are one or two important points to remember in connection with special poisons.

Where oxalic acid is the poison, soda or potash must not be given. If the poison is phosphorous, no oil should be given. For carbolic acid, milk, to which half an ounce of Epsom salts has been added, should be given. In poisoning by prussic acid, the patient must have artificial respiration applied, and cold water should be thrown continuously on the head and spine. For poisoning by bad fish or meat, or by toad-stools, we should give an emetic, and then when this has done its work, we should make the patient take a strong dose of castor oil.

FITS

We sometimes see in our streets a man in an epileptic fit, and it is usual for people to hold his limbs tightly in order to stop his convulsions. This is quite wrong. We should not restrain the movements, except to prevent the patient injuring himself. A piece of wood or similar object should be wrapped in a handkerchief and placed in his mouth to prevent him biting his tongue. The head should be supported.

FAINTING

In fainting and also in other instances of insensibility the person should be laid down with his head slightly raised. All tight clothing should be loosened, plenty of fresh air provided, but nothing given through the mouth until the patient recovers consciousness. Water may then be given, and if the patient wishes to sleep he should be allowed to do so. If an insensible patient shows no signs of breathing, artificial respiration should be applied.

SUNSTROKE

A patient suffering from sunstroke has the skin very hot, especially round the head and neck. He is very faint and giddy, and probably breathes with great difficulty, either too slowly or too hurriedly. He must be laid down in a cool place, with his head and shoulders slightly raised, the throat, head, and chest must be freely exposed to the air, all tight clothing must be loosened, and the patient must be fanned so as to be sure that he gets plenty of fresh air. The head, neck, and spine should be bathed with cold water, and as soon as consciousness returns, the patient may have cold water given him to drink.

HOW TO KNOW THE WOODS IN FURNITURE

AS we examine the furniture in our homes, the tables and chairs, and bookcases and cabinets, or perhaps as we look around a furniture store, we see at once that different articles are made of different kinds of wood. Perhaps we have wondered what these various woods were called, from what trees they came, and in what parts of the world they grew; and it is intended to give here a few particulars which will help us to identify the woods of which most of our furniture is made.

MAHOGANY

Perhaps the most conspicuous of all the timbers used for furniture is mahogany. We can tell it by its deep rich red color, and it seems to take French polish better than other kinds of wood. There are two kinds of mahogany principally used in furniture making —Honduras mahogany, which has an almost straight grain, and Spanish mahogany, in which the grain is more twisted. This grain gives a dark, rather streaky appearance to the wood, which adds to its richness. But if we look out for a really deep red wood highly polished, we cannot very well mistake mahogany. We frequently see it used for shop fronts and for shop counters. Honduras mahogany comes from Central America and Spanish mahogany from the West Indies.

WALNUT

Even more common than mahogany is walnut. This has a greyish-brown color with black-brown pores, and is finely veined with darker shades of brown. It is the wood that the stocks of rifles are made of; and if we look at the rifles of soldiers, we shall at once see the color and grain of walnut.

ROSEWOOD

Another wood much used for cabinets and grand pianos is rosewood. This is a very richly colored and marked timber, and is, perhaps, the handsomest of all woods used for furniture. The color is a reddish brown—redder than walnut and browner than mahogany. The texture is very fine and the surface takes a high polish. The markings, which are of a handsome dark color, vary very much, and are sometimes like watered silk, and at other times like a beautifully-grained marble. The rosewoods from Brazil are more handsomely marked than those from India.

OAK

Oak is largely used in the making of furniture, and varies a good deal in its depth of color. Some kinds are almost of a fawn, or buff, color; other kinds are so dark as to be almost black, and in between there are various shades of brown. The grain of oak is unlike other woods used for furniture, being close, compact and straight. The lines are not continuous but are broken, being almost like dotted lines, giving the wood the appearance of being porous.

EBONY

Ebony is a black, heavy, hard and shiny wood that comes from an Indian tree related to the date palm; but various other woods from Africa, the West Indies, and Texas are also called ebony. German ebony is simply yew-wood stained black. All these are so alike that only an expert can tell the difference.

MAPLE

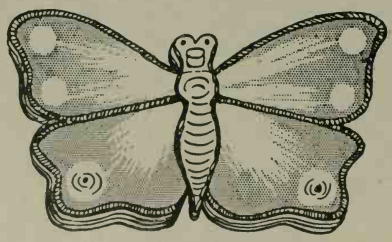
Maple is a fine-grained, light, yet low, wood, much used for bedroom furniture in the United States. Some of it is full of little whorls or specks. This is called bird's-eye maple, and is highly valued, though many people think it less beautiful than the plainer varieties.

These are the principal woods used in furniture. Of course, much of the cheaper kinds of furniture are made of pine, and are merely stained or veneered—that is, covered with a very thin layer of some better kind of wood. In another part of this book will be found an account of an interesting hobby—that of collecting different kinds of wood.

A BUTTERFLY NEEDLE-BOOK

A NOVEL little needle-book can be made in the form of a butterfly. If we turn to the colored plate facing page 3011, we shall see many different kinds of butterflies which may suggest to us shapes and colors suitable for imitation.

Perhaps a scrap of peacock blue or light green velveteen is as pretty a material as we can choose. A piece of white nun's-veiling, delaine, or thin flannel for the leaves of the book and a small piece of stiff calico for the foundation will also be needed.



The butterfly needle-book.

We first draw the outline of the butterfly on paper, using this as a pattern, and in doing this we shall not find any difficulty. Then we cut out the velveteen which is to make the top of our needle-book, together with four thicknesses of nun's veiling and one of calico. It may be that we possess the apparatus for doing burnt-wood work, which is described on page 1298. If so, with it we can indent the outline of the wings, and mark the ridges on the body. Two spots are made in the back of the wings, and pressure with some rounded tool, or even a thimble, will make the shiny markings left white in the picture on this page.

Placing the calico at the bottom, the layers of nun's-veiling next, and the velveteen on the top, we take a needleful of brown thread —embroidery floss would do—and stitch round the outline of the body through all the thicknesses, with long stitches. If we are accustomed to use brushes and paints, we can get pretty effects with hardly any trouble. A little lustre paint imitates well the brilliance of beautiful butterfly colors.

BLINDFOLD GAMES FOR BOYS AND GIRLS

BUFF WITH A WAND

ONE of the players, called Buff, is blindfolded, and stands with a cane in his hand in a circle made by the rest of the players. The players dance round him while someone plays a quick tune on the piano, but they all stop if the music suddenly creases, and Buff points with his wand towards anyone in the circle. The player towards whom he points takes hold of the end of the wand, while Buff gives a cry in imitation of the voice of some animal or bird. The person holding the wand answers in the same manner, and if, by the sound, Buff can guess who the player is, they change places. If he fails, the music starts afresh, the players dance round, and he must try again to guess aright.

BLIND MAN'S STAB

THE players stand at one end of the room. On the open floor, a few paces away, seven or eight pieces of paper about the size of postcards are scattered. On each of these slips of paper some number is written. One of the players is then blindfolded, and taking a stick, sharpened to a point at one end, makes three strides towards the pieces of paper.

Then he stabs at them with his stick, doing his best to pierce those scraps which he knows have the highest numbers on them. Three thrusts are allowed, after which he is led back to the starting point. If his aims were straight the numbers on the pieces of paper that he hit are reckoned to him. Another player then takes his place, and when each has had a turn, the one with the highest record to his or her name wins. Those stand the best chance who remember, after being blindfolded, where lie the papers with the highest numbers on them.

JINGLING

IN this game every player except one is blindfolded. The one who can see carries a small bell, and moving about among the rest, jingles it every now and then, slipping away before he can be caught. It often happens that the players in their efforts to grab the jingler, catch one another, and are not convinced of their mistake till they hear the bell again in a distant part of the room. This is a good game if played with care, but it should not be allowed to become too boisterous.

SPOONS

THE blind man is given two large spoons, and, when all the guests are seated in different parts of the room, he feels his way about until he discovers one of them. Then, with the two spoons, he feels them gently all over, to see if he can tell who it is he has found. Not a word must be spoken, not a sound must be made. If his guess is correct he hands the spoons to his captive, who is blindfolded in turn. The rest of the players should all change places directly the new "spoons" is blindfolded, and should do it quietly. If not, he or she will remember where they were sitting and will name them easily.

DRAWING A PIG

EVEN those who think themselves clever artists will be humbled when they play this game. Each of the party has a piece of paper and a pencil. At a word given by the leader, everyone must close the eyes, and draw on a slip of paper the outline of a pig, not forgetting to put in the eye. No one must look at what he has done till the leader gives permission. The result of drawing a pig in this manner is always surprising. A prize may be given for the best drawing.

PUTTING ON THE DONKEY'S TAIL

WE cut out from a sheet of brown paper the figure of a donkey, as large as possible, but without any tail. We fasten this up against the wall or on a screen. Then we cut out the tail, and pass a pin through that end of it which should be attached to the body. Each player in turn takes the tail in his or her hand, and walking up to the paper figure on the wall, *with both eyes tightly shut*, tries to pin it in the position it ought to occupy. The poor donkey will seldom get his tail put on properly, and the mistakes made are very funny. The winner is the player who puts the tail on nearest to its proper place.

THE BLIND MAN'S BREAKFAST

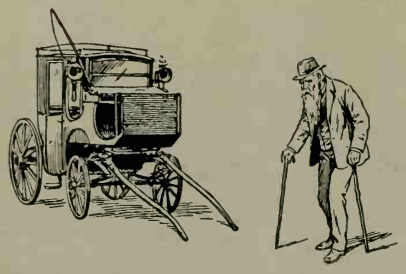
BEFORE starting this game we ought to spread large sheets of paper on the floor. This being done, two players are blindfolded and seated opposite to each other, just within arm's reach. They are then given a slice of bread and butter each, or a cup of bread-and-milk each and spoons, and proceed to feed one another as best they can. Their clothes should be well protected, for the spoons generally go anywhere but into their mouths. The blind man's breakfast is one of the funniest meals in the world.

BLIND PARTNERS

THIS is a game for four players—two blindfolded and two not. Those who can see take one of the blindfolded as a partner, and all sit down, each at one side of a square table—the blind opposite the blind, with their partners to the right hand. A pack of cards is then scattered freely all over the table and, when ready, the blind players are told to supply their partners with "bricks" for building. They at once set about finding the cards, but to do this only one hand may be used, and they must on no account leave their seats.

The builders, however, may direct them by word of mouth, though by no other means, and while bricks are plentiful, things go fairly well. When they become scarce, excitement begins. The hands of the blind men fly over the table; their partners call out directions as fast as they can, only to see the brick they want carried off by the enemy. Sometimes a card is brushed from the table and time is lost before it can be found. But it must be found, and the pair who have the highest castle, or the most bricks, when all the cards have been used up, have won the game.

CAN YOU READ THESE NAMES OF PLANTS?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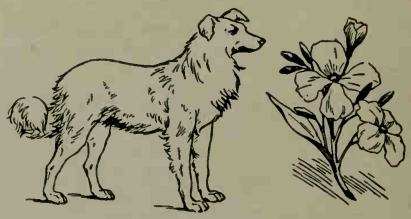
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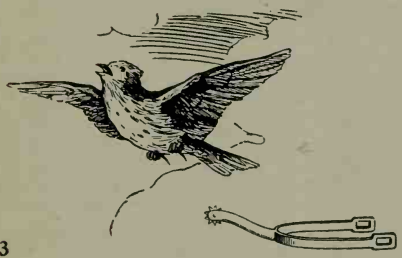
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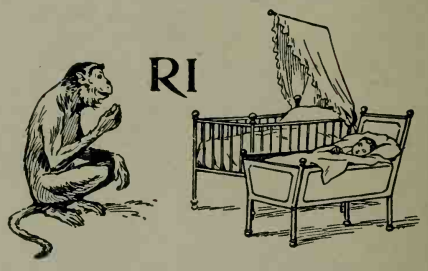

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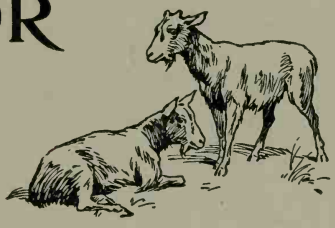
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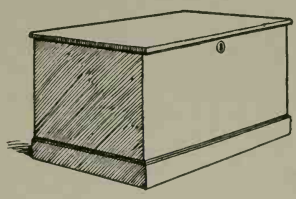
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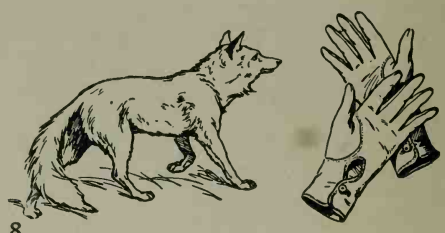
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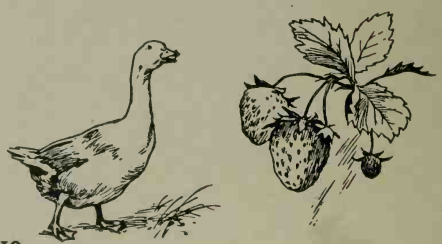
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Study these sets of pictures carefully. By putting together the names of the objects in each set we are able to read the names of ten American plants. The correct solutions to this puzzle are to be found on page 5133.

MAKING ANAGRAMS AS A PASTIME

MOST of us know that an anagram is a rearrangement of the letters of a word or phrase to form a new word or phrase that has some sort of connection with the old. Literally the word anagram means "letters backwards," and originally an anagram was a word or phrase written backwards, as, for example, "evil," which is the anagram of live. But now the name anagram refers to a transposition of the letters in any order, so long as they form a new word or phrase.

HOW TO MAKE ANAGRAMS

A great deal of amusement may be had in a quiet way at a party, or where a few friends have met together, by arranging an anagram game. Some words and phrases are selected and written on slips of paper, and these are then shuffled or shaken up in a hat, and the members of the party then take them in turn until all have an equal number of slips. Then so many minutes are allowed, and when time is called the competitors must stop, and each reads out his original words or sentences and then his anagrams.

A perfect anagram is the result of transposing the letters of a word or phrase in such a way that a new word or phrase is produced without the addition of other letters, and without the omission of any.

Playing at anagrams is not merely an interesting and amusing way of spending an evening. It is a useful, intellectual exercise, and does much to help one in thinking, and in the use of words. It is a pastime that has not been despised by the greatest, and many well-known anagrams are on record that were made up by distinguished scholars and writers.

SCRIPTURE ANAGRAMS

At one time, indeed, anagram-making was a serious study, and the Jewish Rabbis and the schoolmen of the Middle Ages believed that great truths could be discovered from the anagrams upon the words and phrases of Scripture.

A famous Latin anagram is upon Pilate's question: Quid est veritas?—What is truth? the letters of which rearranged give the sentence: Est vir qui adest—It is the man before you. To those who have never tried, it may seem a very simple work to make an anagram, but they should attempt one, and they would find it needs skill and patience. On the other hand, some may think that it would be nearly impossible to transpose a dozen letters to form a word or phrase. When we understand, however, that twelve letters can be arranged in no fewer than 729,000,000 different ways, we see that there are, in the rearrangements, endless possibilities of forming new words.

THE KIND OF WORDS TO CHOOSE

In selecting words for anagrams, it is well to take long words with several vowels in them, as these offer greater facilities for anagrams than short words with few vowels. The kind of words that are suitable are the following: Revolution, which gives Love to ruin; Astronomers, from which we get Moon-starers; Crinoline, that gives Inner coil; French Revolution, that can be transposed into Violence run forth. Impatient gives Tim in a pet; from Radical reform we get Rare mad frolic! Old England can be turned into Golden land, and Paradise Lost into Reap sad toils. Surgeon is a short word, but from it we have the anagram Go, nurse! Telegraphs can be transposed into Great helps, and Universal Suffrage into Guess a fearful ruin—the v in this case being used for a u. Punishment will give Nine thumps, and Penitentiary, Nay, I repent it.

ANAGRAMS FROM NAMES

For a variation, the names of the persons present or of well-known men may be selected, and anagrams made upon these. From Disraeli, for instance, can be obtained the anagram, I lead, sir! but those opposed to this statesman's policy made their anagram upon his name Idle airs.

After the result of the general election of 1880, a political opponent turned The Earl of Beaconsfield into Self-fooled, can he bear it? Charles Dickens gives Cheer sick lands, and Douglas Jerrold, Sure, a droll dog. Two good anagrams from Horatio Nelson are So! nation'l hero and Honor est a Nilo—His honor is from the Nile. From Lord Palmerston we get So droll, pert man, and from Florence Nightingale, Flit on, cheering angel. Another good anagram on Florence Nightingale is Cling on, feeling heart. William Ewart Gladstone has provided several excellent anagrams, such as the following: A man to wield great wills; Go, administrate law well; G, a weird man we all list to; I'll waste no glad war-tune.

Or, for a further change, the names of places, or flowers, or birds, or, in fact, any class of words may be taken, and will provide equally interesting amusement and similar scope for ingenuity to the company present.

WORDS FOR ANAGRAMS

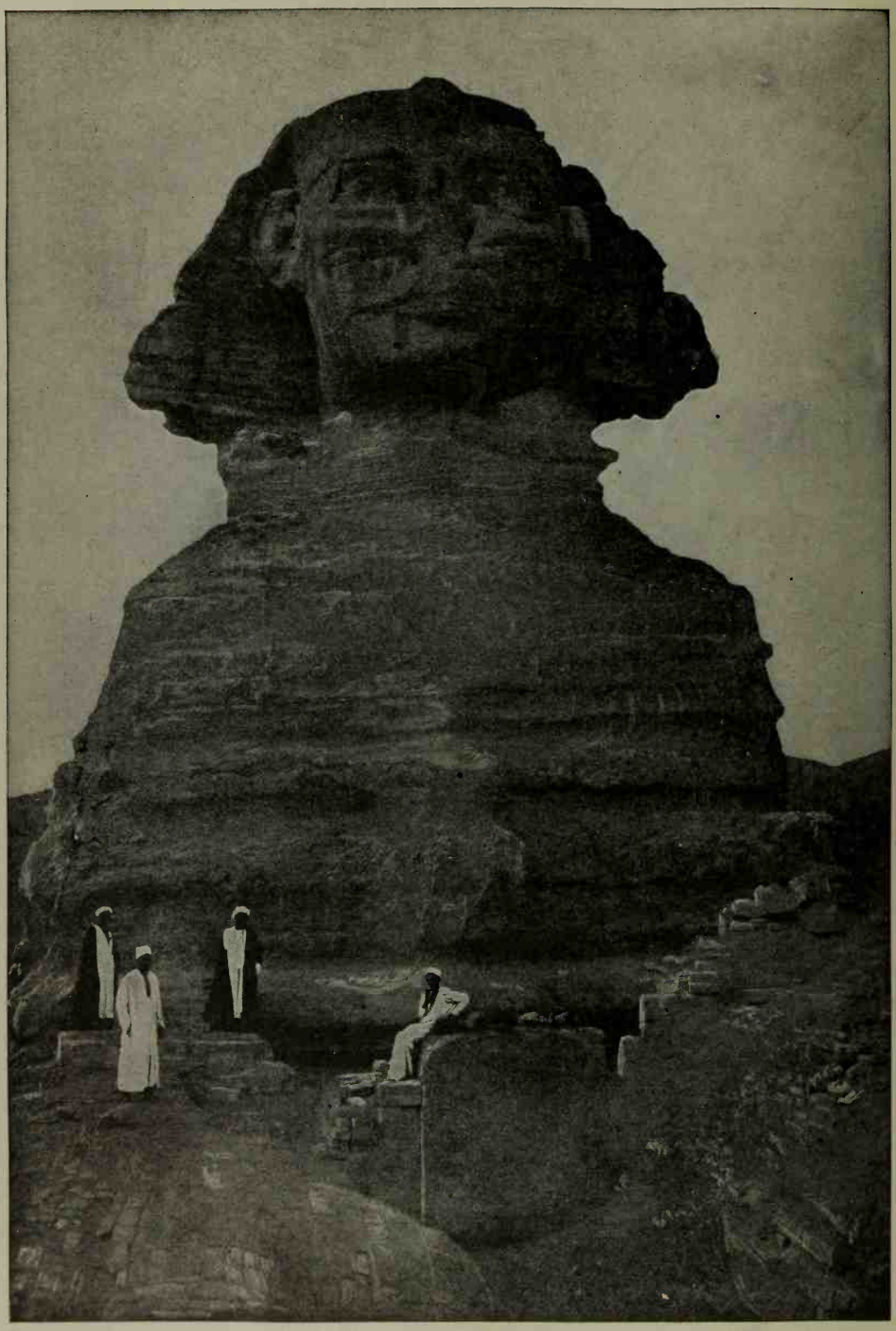
Here are some single words from which good anagrams can be made: Catalogues, Christianity, Crocodile, Lawyers, Melodrama, Midshipman, Parishioners, Presbyterian, Soldiers.

The following words have the article before them, and thus, of course, must be used in the anagram: The calceolaria, The nightingale, The turtle dove. Here are two phrases for making into anagrams: Is pity love? Poor house.

The following names of well-known people also provide good scope for anagrams: John Abernethy, Thomas Carlyle, Charles James Stuart, Henry Wadsworth Longfellow, Alfred Tennyson—Poet Laureate, Sir Robert Peel, William Shakespeare, Robert Southey, George Thompson. In case any of us find difficulty in forming anagrams from these words and phrases, the solutions to all of them are given on page 5133.

THE NEXT THINGS TO MAKE AND THINGS TO DO ARE ON PAGE 5121.

THE OLDEST STATUE IN THE WORLD



The Sphinx at Gizeh, in Egypt, is carved from one mass of solid, natural rock, with the exception of the forepaws, which are built up with blocks of stone. Its date is unknown, but it is probably the oldest statue in the world, and certainly it is the biggest single sculptured figure on earth. It measures over 100 feet long. It is crude and massive, and without detail of any sort. It is very impressive and awe-inspiring on account of its stupendous size and its strong outline. The Arabs call the Sphinx the Father of Terror.

SOME FOREIGN MONUMENTS

CONTINUED FROM 5005

IF we have never seen Stonehenge, we have all heard of it; but do we know why it was built, and by whom? Do we know the histories of Cleopatra's Needles, one of them now in New York, and one in London; or of the Nelson Column in Trafalgar Square, the arch of Decimus Burton at Hyde Park Corner, or the Albert Memorial in Kensington Gardens? Most of us know what these monuments are like from hearing about them and seeing photographs of them; many have passed them and seen them often; but not every one of us knows their histories or knows whether they are really beautiful.

BURTON'S ARCH

Let us begin with Stonehenge, of which a picture appears on this page. It is one of the oldest monuments in the British Isles. The name is taken from the Saxon words *stan*, stone, and *heng*, to hang or support. It is situated on Salisbury Plain, and consists of a double circle of upright stones—an outer and an inner circle. Every pair of these stones originally supported a stone slab, so that the whole structure looked like a double ring of gateways.

The outer ring had thirty upright stones; the inner circle contained about the same number, but of a smaller size. Inside this is an oval formed of ten stones from 16 to 22 feet high, and a huge flat stone marks the centre. The stones are believed to have been carried from Marlborough Downs, 16 miles distant, as there is no stone of the same kind nearer. Round about this ancient structure are many mounds containing very old British remains, and from this it is known that at one time an ancient village or town must have existed here. No one knows who built Stonehenge. Some say it is the work of the Romans; some say it is a memorial to 460 Britons murdered by Hengist, the Saxon; but most people believe it to be a temple set up by the Druids.

Cleopatra's Needle is a name which is very misleading, for Cleopatra had little to do with this monolith, or monument made of a single stone. It was made about 1,470 years before Christ, by order of King Thothmes III. of Egypt, and set up in front of a temple at Heliopolis.

Thirty-one years before Christ the Roman Emperor Augustus defeated Cleopatra, Queen of Egypt, in a naval battle, and about that time he removed the obelisk, or monument, from Heliopolis to Alexandria, where it stood until 1878.

It was sent to England in a specially designed steel case, which was really like the hull of a ship with a raft on top. This queer ship was

being towed to England when it was lost in a storm in the Bay of Biscay. The men on board had been taken off, and the historic stone floated about for two days at the mercy of the waves. Then it was found by another ship, towed to London and set up on the Thames embankment where it now stands. The inscriptions on the stone, which is over 68 feet high, tell about the conquests of the Egyptian king.

A FAMOUS MONUMENT IN LONDON THAT IS BAD IN EVERY WAY

Of very different character is the Albert Memorial in Kensington Gardens, one of the most inartistic monuments in England. It was built from Sir Gilbert Scott's designs in 1878. Like the top of a church steeple planted on the ground, a huge Gothic canopy of colored marbles, stones, and gilded metals enshrines Foley's colossal bronze statue of the Prince Consort. The statue itself is bad, because it is badly designed, heavy and unlifelike, and because it is gilded. Had it been left ungilded, the bronze would have softened the hard lines and made the unnecessary and bad details less noticeable.

As it is, the gilding is a blaze of ugliness that makes the bad shape of the statue more noticeable. At the corners of the steps which surround the monument are four groups of marble figures which represent four continents: Europe, by Macdowell; Asia, by Foley; Africa, by Theed; and America, by Bell. But the chief thing to remember about the Albert Memorial is that it is *bad*.

After seeing this it is a pleasure to look at the beautiful arch at the Hyde Park Corner end of Constitution Hill. This arch is by Decimus Burton. It is simple in design and beautiful in proportion—two most important things in art. There is nothing ugly about this arch—no crowd of detail and unnecessary decoration which would spoil it.

THE GOOD POINTS AND THE BAD POINTS OF THE NELSON COLUMN

Let us now examine the Nelson Column in Trafalgar Square. It was designed by Baily, and consists of a huge Corinthian pillar, or column, copied from one in a Roman temple, supporting a statue of Lord Nelson. The column itself is beautiful, but the statue is not remarkable. The chief fault of the work is that the column is too high for the statue. On the square base are four reliefs representing Nelson's great naval victories; these reliefs are made of the bronze obtained by melting cannon taken from the French. The column was erected in 1843, but the four colossal lions by Landseer, which are the most beautiful part of the monument, were not added till 1871. Their shape is very fine, and the modeling of the beasts is good, restful but full of energy, simple, and grand.

Perhaps the oldest, and certainly the largest, monuments in the world are the Pyramids of Egypt. There are many pyramids in Egypt and in other countries, but the three largest of the nine pyramids at Gizeh are so much more imposing than all the rest that they have become known as *The* Pyramids. Largest of all is the one built by Khufu, who lived nearly 4,000 years before Christ. It is the largest building in the world, and was originally over 480 feet high. Very near these pyramids is the great Sphinx, a monster lion with a human head of strangely fascinating and mysterious expression. Of the Pyramids and Sphinx we read on pages 4841 and 4848, so that we may pass them over here.

THE GREAT GATE OF LIONS, THAT WAS THOUGHT TO BE THE WORK OF GIANTS

Perhaps the oldest sculptured gateway in the world is the Gate of Lions at Mycene—now Argolis—in Greece, not far from Corinth. This gate is of great size, and on a flat stone above the gateway are carved two lions standing with their forelegs raised something like the lion and unicorn on the royal arms of England. The gate was discovered by Dr. Schliemann in 1874. On account of the size of this gate, and other remains near it, it was supposed by the ancient Greeks that it was built by the Cyclops, a race of giants; and thus the gate is still known as an example of Cyclopean work.

Not very far from here is the beautiful Choragic Monument of Lysicrates at Athens—a well-known small temple, or shrine, erected in honor of Bacchus by the *choregos*, or winner of the prize for music or acting at the Dionysian Festival. It was a custom in the days of the Greeks to have competitions in these arts between the different tribes.

On the top of this shrine was placed the tripod, or three-legged bronze bowl, which was given to the choregos as a prize. The very beautiful monument has a square, box-like base, upon which

stands the main body of the shrine, which is round. Upon the face of the round body are pillars, or columns, which support a decorated dome. The tops of the columns, or capitals, are of the Corinthian order—that is, the style used by the people of Corinth. They are the finest examples of that style.

Italy has a larger number of important monuments than any other country, but we shall only describe the ones that are best known, two of which are in Rome. The Trajan Column, a copy of which is at the Victoria and Albert Museum in London, and an imitation of which is the Vendôme Column in Paris, is an enormous pillar decorated with carved figures that illustrate the victories of the Emperor Trajan, who ruled from the year 98 to 117. The column was erected by the architect Apollodorus in 114. The other great monument in Rome is the Arch of Titus, a magnificent example of Roman architecture.

This fine Gothic tomb, surmounted by an equestrian statue, was erected in the fourteenth century in memory of a Lord of Verona who died in 1329. Its strong and severe design reflects the feudal age.

Titus, Roman emperor from 79 to 81, led the Roman army in the war which ended with the destruction of Jerusalem in the year 70, and the arch was built in memory of this victory. It is the finest of all the triumphal arches of the Romans. To the days of Venetian power, when the merchant republic on the Adriatic ruled the seas, belongs the famous column which supports the Lion of St. Mark in the Piazzetta in Venice. The bronze lion is winged and has a very long tail. Its forefeet are planted upon an open book, and though the head of the animal is very fierce and ugly, its appearance from below is graceful and pleasing. It is the work of the fifteenth century, but the sculptor who made it is not known.

As the Vendôme Column in Paris is an imitation of the Trajan Column in Rome, so the great Arc de Triomphe du Carrousel, also in Paris, is an imitation of the Arch of Severus at Rome. It was built by the order of Napoleon I. to commemorate his victories of 1805 and 1806. The arch, which is 48 feet high, 63½ feet wide, and 21 feet thick, has three arcades decorated with Corinthian columns of red marble. The reliefs commemorate the achievements of the emperor and the army. On the top was originally the celebrated group of four horses that now rests above the entrance to St. Mark's in Venice, but since the horses were sent back to Venice another group has been placed above the Arc de Triomphe in Paris. The Arc de Triomphe shown on page 5048 is another arch.

What is it that makes a monument "good" or "bad"? People seem to think that anything is good because *they* like it But this is not so. We have now begun to improve, but we must remember that for three hundred years, art grew worse and worse, and the very worst period of all was reached in the middle of last century, in what is called the mid-Victorian period. So all around us we find that most of the buildings and monuments are very bad because most of them were made during the very worst period of art. From about 1750, artists did their best to startle people by carving a figure in a manner that they hoped would astonish. The sculptor carved every hair on his statue's head, and made all his work as close an imitation of live creatures as he could. The architect made buildings with turrets and knobs, and thought because he smothered his building with ornamentation that he did good work. A good piece of work must *not* be an imitation of Nature, but a poetic rendering of it. A monument to be good must be *suitable* to its object and to its position. It must have good proportions. Detail and decoration must be subdued and of secondary importance, or they will interfere with the principal lines and shapes.

THE NEXT FAMILIAR THINGS ARE ON PAGE 5071.

THE MIGHTY MONUMENTS OF EGYPT

The Great Pyramid of Cheops, or Chufu, is a masterpiece of architecture and building. Designed to last for ever and protect the remains of the king, it is built with a skill in mason work that is unsurpassed. The lining blocks of granite inside are fitted and smoothed so perfectly that it is impossible to insert the blade of a knife between them. Its shape is the shape most likely to endure through ages of time, and the 7,000 years that have passed away since this mighty monument was built have damaged the pyramid hardly at all.

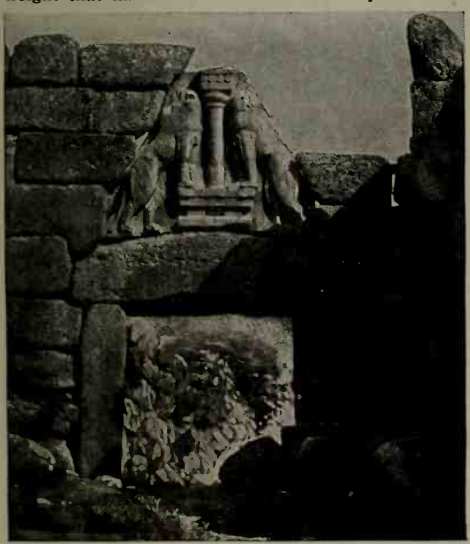
The red granite statue of Rameses II. in the temple of Luxor, on the Nile, is a beautiful example of Egyptian sculpture of about 1,270 years before Christ. It is carved in a simple, refined manner from one of the hardest stones known, and is wonderfully preserved.

The pylon which stands before the temple of Karnak, built about 1,320 years before Christ, is rather like the triumphal arches which adorn the cities of Europe. It is beautiful because the proportions are good. The supporting piles are tall and tapering.

ANCIENT AND MODERN MONUMENTS

The Choragic Monument of Lysicrates at Athens, though small, is one of the finest examples of the Greek Corinthian style. The proportion which the columns bear to the entablature that rests upon them is very beautiful; the pillars are of a size and height that harmonize with the round top and roof.

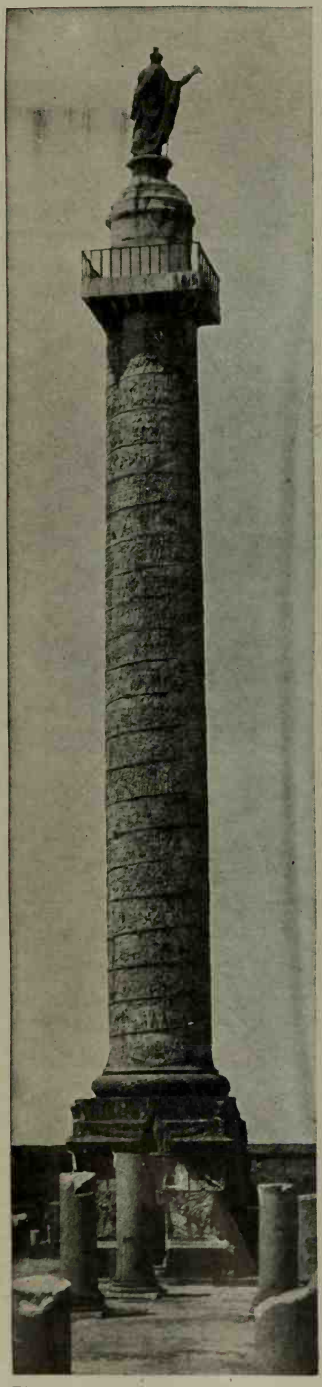
The Lion of St. Mark is supported by a tall, slender column which splays or spreads out at the top, the capital and the cornice above making a continuous line curving outwards. The winged lion is pleasant only in general outline. Its legs are planted wide apart, and the tail trailing behind gives a feeling of security.



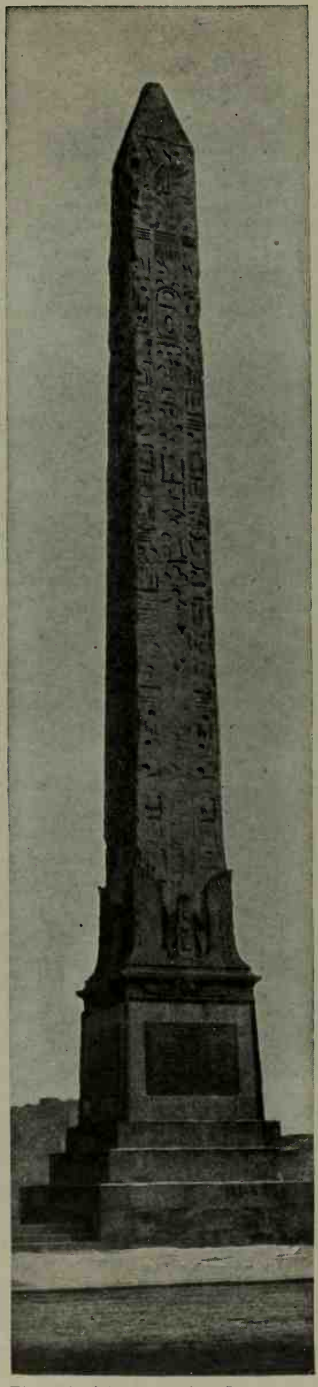
The two lions over the gate at Mycene, filling perfectly, with the pillar between them, a nicely proportioned triangle, form a design that could not well be improved. The straight lines and big shapes give an effect of strength not only satisfying in itself, but in keeping with the wall and gateway which it decorates. The masonry is rough hewn and huge, the lions are huge also, and, like the stones, strong in outline and square in the shapes of their trunks and limbs.

The tomb of Canova is like Canova's own work; in fact, it was done by his pupils. It is hard in outline, for instead of the figures being modeled like poetry, they are too natural—too full of detail. We do not speak like poetry. Poetry tells of real life, but in beautiful phrases. Sculpture should be the same: it should represent life, but should be full of beautiful softness, and the figures here should be held together in groups and shapes, like the words in poetry.

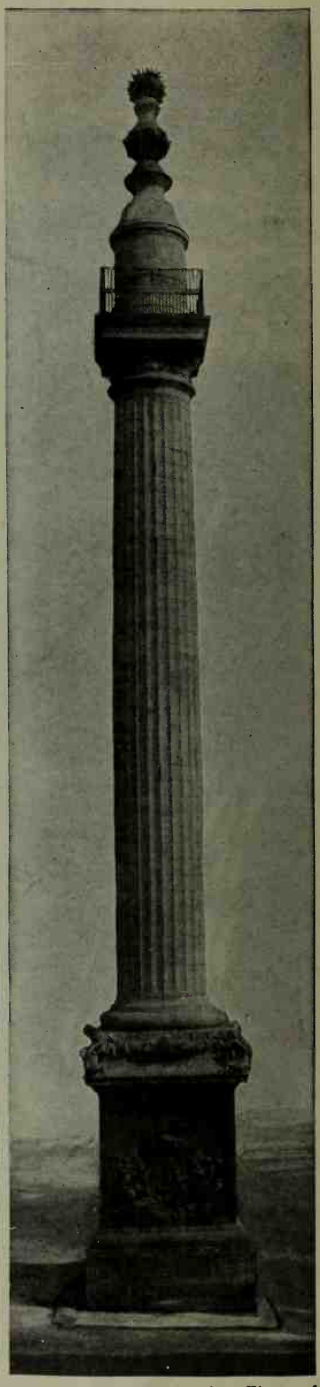
THREE FAMOUS PILLARS OF STONE



The general appearance of the Trajan Column is ordinary. It was made to support a figure, and would have been splendid for that purpose on account of its simple form, but the balcony has ruined it.



The obelisk now in London is but a fragment of the original monolith. To a student of Egyptian art it is an interesting example of an obelisk. A plain square stone would be a better base.



The monument to the Fire of London is beautiful as far as the cornice. The meaningless erection above is bad. It would be better had the fire-ball been placed directly upon the cone above the railing.

ONE OF THE WORLD'S WORST MONUMENTS

The Albert Memorial is among the worst monuments in the world. It is bad because it is a mass of most intricate and gaudy detail. It looks spiky and hard. The mixture of all sorts of colors, stones, and metals is vulgar and florid. There is no simplicity, no strength, no shape, and no unity in it. It is weak and ugly and extravagant.

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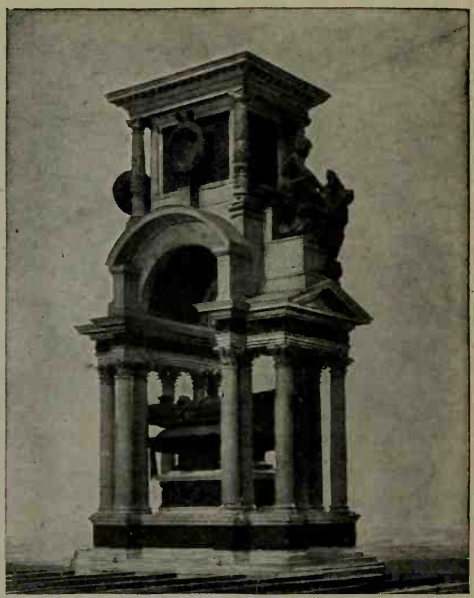
HOW THE NELSON COLUMN WAS SPOILED

The Nelson Column is a combination of different parts which do not suit each other. The base is too large and is unnecessary. The bronze panels are too large, and destroy the strength of the pedestal. Though, as an example of a Corinthian column, it is good, it is unsuited to support a figure, because the cornice hides the figure. It would be better were the column plain, or fluted like the monument of the Great Fire. The figure itself is bad. The outline should show us who and what the figure is, and this it certainly does not do.

FOUR OF THE BEST MONUMENTS IN BRITAIN

The statue of Charles I. in London is perhaps the best monument in England. The pedestal is strong, with big, plain centre and sculpture small in proportion, unspoiled by moldings such as those on the Nelson Column; the horse and rider are simple and good.



The tomb of Wellington, in St. Paul's, has at least some simplicity and proportion. It is better than many others, although it is a trifle heavy. We should notice how much better the sculptured figures look because the rest of the monument was kept plain.

The Wallace Monument at Stirling is a weird mixture of florid French architecture and German invention. Its general form is not bad, but the pinnacles on top are poor and unnecessary. If we were to cut it off at the battlements it would be stronger and better.

The Scott Monument in Edinburgh has some good details, but as a whole is bad, for it is too crowded with little fine details. When such a monument is smothered with elaborate ornament, as this is seen to be, it destroys the outline and bothers us with details.

THREE FAMOUS TRIUMPHAL ARCHES

The Arch of Constantine is the finest example in the world of a three-span arch. The proportions are very fine, but the elaboration just above the arches spoils it. It would have been better if, like the Arch of Titus, it had been simpler. The columns are slender and good. The shape of the whole is splendid.

The Arch of Titus is divided into pleasing shapes, big, simple, and strong at bottom; thinner sides that have less weight above; beautiful columns at the corners to support the cornice, which binds the whole together; and a perfectly plain top, which, by its plainness, gives more value to the little decoration.

The Arc de Triomphe de l'Etoile in Paris, cannot be said to be altogether good. The sides are too heavy, and there is no thickening at the base, such as we see in the Arch of Titus; the frames of the sculptured panels are too large, and the top is too heavy. Nevertheless, it presents a stately and imposing appearance. Rude's famous group, on the right of the arch, is full of fire, but as a whole the sculptured groups lack repose.

THE STORIES OF JULES VERNE

THE second of Jules Verne's famous imaginative stories chosen for reading here is very different from "Round the World in Eighty Days." "Twenty Thousand Leagues under the Sea" is, perhaps, the best example of his tales of the marvels of invention, and we have to remember that when it was written, in 1873, nobody had yet succeeded in making a boat to travel under water. For that reason it was, in a way, a prophetic book, shadowing forth the wonderful possibilities of human ingenuity in exploring the ocean's unknown depths. Great progress has since been made in submarine vessels, but, of course, we are still far from seeing anything so extraordinary as the Nautilus of Verne's brilliant imagination. It is conceivable, however, that the day may come when submarines will be so developed as to enable men to explore the depths of the ocean with as much ease and confidence as they now sail on its surface.

TWENTY THOUSAND LEAGUES UNDER THE SEA

CONTINUED FROM 4919

IN the year 1866 the whole seafaring world of Europe and America was greatly disturbed by an ocean mystery which baffled the wits of scientists and sailors alike. Several vessels, in widely different regions of the seas, had met a long and rapidly moving object, much larger than a whale, and capable of almost incredible speed. It had also been seen at night, and was then phosphorescent, moving under the water in a glow of light.

There was no doubt whatever as to the reality of this unknown terror of the deep, for several vessels had been struck by it, and particularly the Cunard steamer Scotia, homeward bound for Liverpool. A large triangular hole had been pierced through the steel plate of the Scotia's hull, and if she had not been divided into seven watertight compartments, any one of which could stand injury without danger to the vessel, the ship would certainly have been sunk. It was three hundred miles off Cape Clear that the Scotia encountered this mysterious monster. After a delay of some days the travelers arrived at Liverpool, and the ship was put into dock, where the result of the blow from the unknown was thoroughly investigated. So many vessels had recently been lost from unknown causes, that the narrow escape of the Scotia directed fresh attention to this ocean mystery, and both in Europe and America there was a strong public agitation for an expedition to be sent out, prepared to do battle with, and if possible destroy, this narwhal of monstrous growth, as many scientists believed it to be.

Now I, Pierre Arronax, assistant-professor in the Paris Museum of Natural History, was at this time in America, where I had been engaged on a scientific expedition into the disagreeable region of Nebraska. I had arrived at New York in company of my faithful attendant, Conseil, and was devoting my attention to classifying the numerous specimens I had gathered for the Paris Museum. As I had already some reputation in the scientific world from my book on "The Mysteries of the Great Submarine Grounds," a number of people did me the honor of consulting me concerning the one subject then exercising the minds of all interested in ocean travel.

An expedition was also being fitted out by the United States government, the fastest frigate of the navy, the Abraham Lincoln, under command of Captain Farragut, being in active preparation, with the object of

hunting out this wandering monster which had last been seen three weeks before by a San Francisco steamer in the North Pacific Ocean. I was invited to join this expedition as a representative of France, and immediately decided to do so. The faithful Conseil said he would go with me wherever I went, and thus it came about that my sturdy Flemish companion, who had accompanied me on scientific expeditions for ten years, was with me again on the eventful cruise which began when we sailed from Brooklyn for the Pacific and the unknown.

The crew of the frigate and the various scientists on board were all eagerness to meet the great cetacean, or sea-unicorn. My own opinion was that it would be found to be a narwhal of monstrous growth, for these creatures are armed with a kind of ivory sword, or tusk, as hard as steel, and sometimes nearly seven feet long, by fifteen inches in diameter at the base. Supposing one to exist ten times as large as any that had ever been captured, with its tusk proportionately powerful, it was conceivable that such a gigantic creature, moving at a great rate, could do all the damage that had been reported.

How we first saw the mysterious terror of the seas

There was among our crew one Ned Land, a gigantic Canadian of forty, who was considered to be the prince of harpooners. Many a whale had received its death-blow from him, and he was eager to flesh his harpoon in this redoubtable cetacean which had terrified the marine world.

Week after week passed without any sign that our quest would be successful. Indeed, after nearly four months had gone, and we had explored the whole of the Japanese and Chinese coasts, the captain reached the point of deciding to return, when one night the voice of Ned Land was heard calling:

"Look out there! The thing we are looking for on our weather-beam!"

At this cry the entire crew rushed towards the harpooner—captain, officers, masters, sailors, and cabin-boys; even the engineers left their engines, and the stokers their furnaces. The frigate was now moving only by her own momentum, for the engines had been stopped. My heart beat violently. I was sure the harpooner's eyes had not deceived him. Soon we could all see, about two cables' length away, a strange and luminous object, lying some fathoms below the surface, just as described in many of the reports. One of the officers suggested that it was merely an enormous mass of phosphorous particles, but I replied with conviction that the light was electric. And even as I spoke the strange thing began to move towards us!

At close quarters with the strange luminous monster

The captain immediately reversed engines and put on full speed, but the luminous monster gained on us and played round the frigate with frightful rapidity. Its light would go out suddenly and reappear again on the other side of the vessel. It was clearly too great a risk to attack the thing in the dark, and by midnight it disappeared, dying out like a huge glow-worm. It appeared again, about five miles to the windward, at two in the morning, coming up to the surface as if to breathe, and it seemed as though the air rushed into its huge lungs like steam in the vast cylinders of a 2,000 horse-power engine.

"Hum!" said I. "A whale with the strength of a cavalry regiment would be a pretty whale!"

Everything was in readiness to attack with the coming of the dawn, and Ned Land was calmly sharpening his great harpoon, but by six in the morning the thing had again disappeared, and a thick sea-fog made it impossible to observe its further movements. At eight o'clock, however, the mist had begun to clear, and then, as suddenly as on the night before, Ned Land's voice was heard calling: "The thing on the port-quarter!"

There it was, surely enough, a mile and a half away, now a large black body showing above the waves, and leaving a track of dazzling white as its great tail beat the water into foam.

What happened when Ned Land threw his harpoon

Moving rapidly, it approached within twenty feet of the frigate. Ned stood ready at the bow to hurl his harpoon and the monster was now shining again with that strange light which dazzled our eyes. All at once he threw the harpoon. It struck on a hard body.

Instantly the light went out and two enormous water-spouts fell on our deck. A frightful shock followed, and the next moment I found myself struggling in the sea. Though a good swimmer, I kept afloat with some difficulty, and great was my joy when I heard the voice of the faithful Conseil, who had jumped in after me. Much stronger than I, he helped me to remove some of my clothes, and thus we kept afloat until I fainted.

When I regained consciousness, I found myself on the top of what seemed to be a floating island, and there was Ned Land as well as Conseil. We were on the back of the mysterious monster, and it was made of metal! Presently it began to move, and we were afraid it might go below the surface.

Indeed, it seemed to be on the point of submerging, when Land hammered loudly on the metal plates, and in a moment an opening was made and the three of us were drawn inside by eight masked men. A door banged on us, and for half an hour we lay in utter darkness. Then a brilliant electric light flooded the cabin, a room of about twenty feet by ten, and two men entered. One was tall, pale, and dark-eyed, but magnificently proportioned.

WE BECOME PRISONERS OF CAPTAIN NEMO INSIDE THE SUBMARINE

Though we spoke to them in French, German, English, and Latin, they did not seem to understand, while their own speech was unintelligible to us. But they gave us clothes and food. After eating the food, which was strange but delicious, we all lay down and slept the sleep of sheer exhaustion.

Next day the tall man, whom I afterwards came to know as Captain Nemo, master of this marvelous submarine boat, came to me, and, speaking in French, said:

"I have been considering your case, and did not choose to speak till I had weighed it well. You have pursued me to destroy me. I have done with society for reasons of my own. I have decided. I give you choice of life or death. If you grant me a passive obedience, and submit to my consigning you to your cabin for some hours or days, as occasion calls, you are safe. You, Monsieur Arronax, have least cause to complain, for you have written on the life of the sea—I have your book in my library here—and will benefit most when I show you its marvels. I love it. It does not belong to despots."

Clearly we could do nothing but submit, and afterwards Captain Nemo showed me his wondrous craft.

THE TREASURES AND THE MARVELS OF THE FIRST SUBMARINE VESSEL

It was indeed a thing of marvels; for, besides the dining-room, it contained a large library of twelve thousand volumes, a drawing-room measuring thirty feet by eighteen, and fifteen high. The walls of this apartment were adorned with masterpieces of the great painters, and beautiful marbles and bronzes. A large piano-organ stood in one corner, and there were glass cases containing the rarest marine curiosities which a naturalist could wish to see. A collection of enormous pearls in a cabinet must have been worth millions, and Captain Nemo told me he had rifled every sea to find them.

The room assigned to me was fitted up with every luxury, yet the captain's own apartment was as simply furnished as a monastic cell, but in it were contained all the ingenious instruments that controlled the movements of the Nautilus, as his submarine was named. The electricity was manufactured by a process of extracting chloride of sodium from the sea-water, but the fresh air necessary for the life of the crew could only be obtained by rising to the surface. The engine-room was sixty-five feet long, and in it was the machinery for producing electricity as well as that for applying the power to the propeller.

The Nautilus, Captain Nemo explained, was capable of ploughing along at a speed of fifty miles an hour, and could be made to sink or rise with precision by flooding or emptying a reservoir. In a box, raised somewhat above the hull and fitted with glass ten inches thick, the steersman had his place, and a powerful electric reflector behind him illumined the sea for half a mile in front.

HOW THE SMALL BOAT OF THE NAUTILUS COULD BE USED

The submarine also carried a small torpedo-like boat, fitted in a groove along the top, so that it could be entered from the Nautilus by opening a panel, and, after that was closed, the boat could be

detached from the submarine, and would then bob upwards to the surface like a cork. The importance of this and its bearing on my story will appear in due time.

It was on a desert island that Captain Nemo had carried out the building of the Nautilus, and from many different places he had secured the various parts of the hull and machinery, in order to maintain secrecy.

THE BEAUTY AND FASCINATION OF LIFE UNDER THE SEA

Deeply interested as I was in every detail of this extraordinary vessel, and excited beyond measure at the wonders which awaited me in exploring the world beneath the waves, I had still the feeling of a prisoner who dared scarcely hope that liberty might some day be obtained. But when the metal plates which covered the windows of the saloon were rolled back as we sailed under the water, and on each hand I could see a thronging army of many-colored aquatic creatures swimming around us, attracted by our light, I was in an ecstasy of wonder and delight.

Then days would pass without Captain Nemo putting in an appearance, and none of the crew were ever to be seen. But the Nautilus kept on its journey, which, I learned, took us to the Torres Strait, the Papuan coast, through the Red Sea, through a subterranean strait, under the Isthmus of Suez, to the island of Santorin, the Cretan Archipelago, to the South Pole, on whose sterile wastes Captain Nemo reared his black flag with a white "N" upon it, and through the Gulf Stream.

Of the wonders of the deep, those amazing and beautiful specimens of unknown life that passed before my vision on this strange journey, never before seen by the eye of any naturalist, I cannot here enter into particulars. But it must not be supposed, prisoners though we were, that we never emerged from the interior of the Nautilus.

WE ARE INVITED TO JOIN A SUBMARINE HUNTING EXPEDITION

One of my first surprises, indeed, was to be invited by Captain Nemo to accompany him on a hunting expedition in the marine forest that grew about the base of the little island of Crespo, in the North Pacific Ocean We were told to make a hearty breakfast, as the jaunt would be a long one. This we did, for we had soon become accustomed to the strange food, every item of which was produced by the sea.

For our submarine excursion we were furnished with diving dresses of seamless india-rubber, fitted on the shoulders with a reservoir of stored air, its tubes opening into the great copper helmet. We even had powerful air-guns and electric bullets, which proved weapons of deadly precision. When inside our diving dresses, we could not move our feet on account of the enormous leaden soles, so that we had to be pushed into a compartment at the bottom of the vessel, and the iron doors secured behind us. Water was then pumped in, and we could feel it rising around us, until the compartment was full, when an outer door opened and we stepped on to the floor of the sea.

For some considerable distance we walked along sands of the most perfect smoothness, and then had to make our way over slimy rocks and treacherous masses of seaweed, before we reached the fairy-like forest under the sea, where all the branches of the marvelous growths ascended perpendicularly.

THE MYSTERY OF THE WOUNDED ENGLISHMAN AND A BURIAL IN THE SEA

It was indeed a rare experience for me, who had written "The Mysteries of the Great Submarine Grounds," thus to see, at first hand, the life of which I had only been able to speculate on before. We captured many rare specimens, and shot a fine sea-otter, the only known quadruped that inhabits the rocky depths of the Pacific. It was five feet long, and its skin was worth five hundred dollars.

So constantly was I enchanted with the wonders of our journey that day succeeded day without my taking note of them; but Captain Nemo, for all his kindness, still remained as mysterious as the Sphinx. One day he became violently agitated after looking through the glass at a point indicated by his lieutenant, and I and my companions were immediately imprisoned in darkness, as we had been when first taken into the Nautilus. When I awoke next morning the captain took me to see a wounded Englishman whose head had been shattered, and on my stating that the man could not live for two hours, the dark eyes of the captain seemed to

fill with tears. I thought that night I heard sounds of a funeral hymn, and next day I was taken to a submarine forest of coral, where they buried the man. This was really a little cemetery beneath the sea, as I gathered from the coral cross which had been erected there. Ned Land, unlike me, was soon satisfied with what he had seen of the submarine world, and had now but one thought of escape; but no opportunity had yet offered. We were sailing up the eastern coast of South America, and by May 17 were some five hundred miles from Heart's Content. There I saw, at a depth of more than fifteen hundred fathoms, the great electric cable lying at the bottom of the ocean. The restlessness of poor Ned Land was at its height when he had a glimpse of the American shore; but Captain Nemo bent his course towards Ireland, and then southward, passing within sight of Land's End on May 30.

OUR VISIT TO THE OCEAN GRAVE OF THE OLD AVENGER

All the next day the vessel seemed to be making a series of circular movements, in some endeavor to locate a particular spot, and the captain was gloomier than I had ever seen him, having no word for me. The following day, which was beautifully clear, we could make out, some eight miles to the eastward, a large steam vessel flying no flag. Suddenly, after using his sextant, the captain exclaimed; "It is here!"

Presently the Nautilus sank to the bottom of the sea. When at rest the lights were put out and the sliding panels opened. We could now see on our starboard the remains of a sunken vessel, so encrusted with shells that it must have lain there a great many years. As I stood there wondering what might be Captain Nemo's reason for his manœuvres, he came to my side and, speaking slowly, said:

"That was the Marseillais, launched in 1772. It carried seventy-four guns, and fought gallantly against the Preston, was in action again at the siege of Granada, and in Chesapeake Bay. Then in 1794 the French Republic changed the vessel's name, and it joined a squadron at Brest to escort a cargo of corn coming from America. The squadron fell in with an English man-o'-war, and seventy-two years ago to this very day, on this very spot, after fighting heroically, until its masts were shot away, its hold full of water, and a third of its crew disabled, this vessel preferred to sink, with its 356 sailors, than to surrender. Nailing its colors to the mast, it sank beneath the waves to the cry of 'Long live the Republic!' "

"The Avenger?" I exclaimed.

"Yes, the Avenger. A good name!" said the captain, with a strange seriousness, as he crossed his arms.

THE BEGINNING OF ANOTHER GREAT TRAGEDY OF THE OCEAN

I was deeply impressed with his whole bearing while he recalled these facts. It was clearly no common spite against his fellow-men that had shut up Captain Nemo and his crew in the Nautilus.

Already we were ascending, fast leaving the grave of the old Avenger. When we had reached the surface we could see the other vessel steaming towards us. A low boom greeted the Nautilus as its upper part showed above the water. Ned Land, aflame once more with hope of escape, made out the vessel to be a two-decker ram, but she showed no flag at her mizzen. It seemed for a moment there might just be some chance of escape for us three prisoners, and Ned declared he would jump into the sea if the man-o'-war came within a mile of us. Just then another gun boomed out. She was firing at us.

It flashed across my mind at that moment that as those on board the Abraham Lincoln, having seen the effect of Ned Land's harpoon when it struck the Nautilus, could not but have concluded that their enemy was no monster of the deep—though indeed a monster of man's contriving—the warships of all nations would now be on the look-out for the Nautilus, and we on board it could scarcely hope for mercy.

CAPTAIN NEMO VOWS VENGEANCE AND SHOWS HIS BLACK FLAG

The shot rattled about us as we stood on the opened upper deck of the submarine, and Ned Land, in a mad moment, waved his handkerchief to the enemy, only to be instantly felled by the iron hand of Captain Nemo. Then, frightfully pale, the captain turned towards the approaching man-o'-war, and in a voice terrible to hear, cried; "Ah, ship of an accursed nation, you know

who I am! I do not need to see your colors to know you. Look, and see mine!"

So saying, he unfurled his black flag, and then sternly bade us go below, just as a shell struck the Nautilus, and rebounded into the sea. "You have seen the attack," he said more calmly. "I shall sink yonder ship, but not here—no, not here. Her ruins shall not mingle with those of the Avenger."

WE HAVE HIGH HOPES OF ESCAPE, BUT ARE PRISONERS STILL

Having no choice but to obey, we all went below, and the propeller of the Nautilus was soon lashing the water into creamy foam, taking us beyond the range of fire. I held my peace for a time, but, after some deliberation, ventured to go up in the hope of dissuading Captain Nemo from more destruction. His vessel was now coursing round the other ship like a wild beast manœuvring to attack its prey, and I had scarcely spoken when the captain turned on me fiercely, commanding silence.

"Here I am the law and the judge," he said, almost in a shriek. "There is the oppressor. Through him I have lost all that I have loved, cherished, and venerated — country, wife, children, father, and mother. I saw all perish! All that I hate is represented by that ship! Not another word!"

In the face of such fierce hatred it was useless to try persuasion. I and my companions resolved to attempt escape when the Nautilus made the attack. At six next morning, being the second day of June, the two vessels were less than a mile and a half apart. Suddenly, as the three of us were preparing to rush on deck and jump overboard, the upper panel closed sharply. Our chance was gone!

HOW THE NAUTILUS DESTROYED THE UNKNOWN MAN-O'-WAR

Next moment the noise of the water rushing into the reservoir indicated that we were sinking, and in a moment more the machinery throbbed at its greatest speed as the Nautilus shot forward under the sea. Then the whole submarine trembled; there was a shock, and then a rending jar above. The terror of the seas had cut its way through the other vessel like a needle through sailcloth! Horror-stricken, I rushed into the saloon and found Captain Nemo, mute and gloomy, standing by the port panel, which had instantly been slid back, watching with a terrible satisfaction the injured vessel sinking with all its crew beneath the waves. The Nautilus sank with it, so that its terrible captain might lose nothing of the fascinating horror presented by the spectacle of his victims descending to their ocean grave. When we had seen all, he went to his room, and, following him, I saw on the wall the portraits of a woman, still young, and two little children. He looked at them, and as he stretched his arms toward them the fierce expression of hate died away from his face. He sank down on his knees, and burst into deep sobs. I felt a strange horror for this man, who, though he might have suffered terribly, had no right to exact so terrible a vengeance.

The Nautilus was now making its top speed, and the instruments indicated a northerly direction. Whither was it flying? That night we covered two hundred leagues of the Atlantic. Onward we kept our course, the speed never lessening, and for fifteen or twenty days, during which we prisoners never saw the captain or his lieutenant, this headlong race continued.

OUR FLIGHT THROUGH THE ATLANTIC, AND ANOTHER PLAN OF ESCAPE

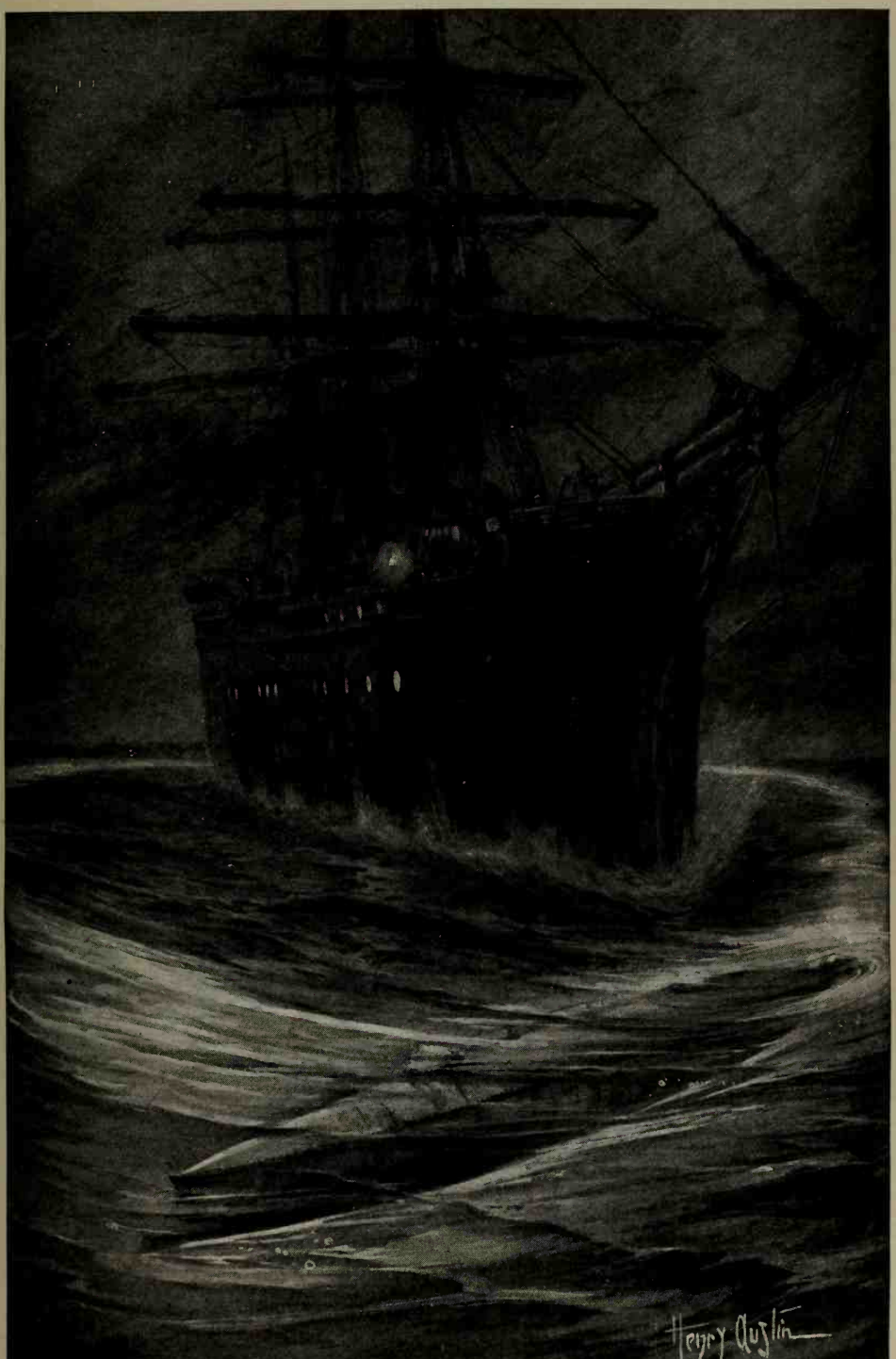
Poor Ned Land was in despair, and Conseil and I had to watch him carefully lest he might kill himself. One morning he said to me:

"We are going to fly to-night. I have taken the reckoning, and make out that twenty miles or so to the east is land. I have a little food and water, and Conseil and I will be near the opening into the small boat at ten. Meet us there. If we do not escape, they sha'n't take me alive."

"I will go with you," I said. "At least we can die together."

Wishing to verify the direction of the Nautilus I went to the saloon. We were going N.N.E. with frightful speed at a depth of twenty-five fathoms. I took a last look at all the natural marvels and art treasures collected in this strange museum, a collection doomed to perish in the depths of the ocean with the man who had made it. Back in my own room I donned my sea garments, and placed all my notes carefully about my clothing. My heart

THE HIDDEN TERROR OF THE SEAS



The wonderful submarine vessel, invented and commanded by Captain Nemo, circled round the man-o'-war, like a beast of prey about to attack its victim, and playing with it before it strikes the death-blow.

was beating so loudly that I feared my agitation might betray me if I met Captain Nemo. I decided it was best to lie down on my bed in the hope of calming my nerves, and thus to pass the time till the hour determined upon for our attempt. Ten o'clock was on the point of striking, when I heard Captain Nemo playing a weird, sad melody, and I was struck with the sudden terror of having to pass through the saloon while he was there. I must make the attempt, and softly I crept to the door of the saloon and softly opened it. Captain Nemo was still playing his subdued melody; but the room was in darkness, and slowly I made my way across it to the library door. I had almost opened this when a sigh from him made me pause.

He had risen from the organ, and, as some rays of light were now admitted from the library, I could see him coming slowly toward me with folded arms, gliding like a ghost rather than walking. His breast heaved with sobs, and I heard him murmur these words, the last of his that I heard: "Enough! O God, enough!" Was it remorse escaping thus from the conscience of this mysterious being?

Had I not seen it begin with the tears in his eyes at the death of the Englishman whom he had buried in the coral cemetery, and who was doubtless a victim of one of his acts of destruction?

MY DESPERATE DASH FOR LIBERTY AND THE LAST OF CAPTAIN NEMO

Now rendered desperate, I rushed into the library, up the central staircase, and so gained the opening to the boat where my companions were awaiting me. Quickly the panel through which we went was shut and bolted by means of a wrench which Ned Land had secured. We got inside the boat, the opening of which we quickly fastened, and the harpooner began to undo from the inside the screws that still fastened the boat to the Nautilus. Suddenly a great noise was heard within the submarine. We thought we had been discovered, and were prepared to die defending ourselves. Ned Land stopped his work for the moment, and the noise grew louder. It was a terrible word, twenty times repeated, that we heard. "The Maelstrom! The Maelstrom!" was what they were crying. Was it to this, then, that the Nautilus had been driven, by accident or design, with such headlong speed? We heard a roaring noise, and could feel ourselves being whirled about in spiral circles. The steel muscles of the submarine were cracking, and at times in the awful churning of the whirlpool it seemed to stand on end. "We must hold on," cried Land. "We may be saved if we can stick to the Nautilus."

HOW THE SMALL BOAT SAVED US FROM THE TERROR OF THE MAELSTROM

His anxiety now was to make fast the screws that bound the boat to the submarine, but he had scarcely finished speaking when, with a great crash, the bolts gave way, and released from the larger vessel, the boat shot up, into the midst of the whirlpool. My head struck on its iron framework, and with the violent shock I lost all consciousness.

How we escaped from that hideous gulf, where even whales of mighty strength have been tossed and battered to death, none of us will ever know! But I was in a fisherman's hut on the Lofoden Isles when I regained consciousness. My two companions were by my side, safe and sound, and we all shook hands heartily. There we had to wait for the steamer that runs twice a month to Cape North, and in the interval I occupied myself revising this record of our incredible expedition in an element previously considered inaccessible to man, but to which progress will one day open up a way.

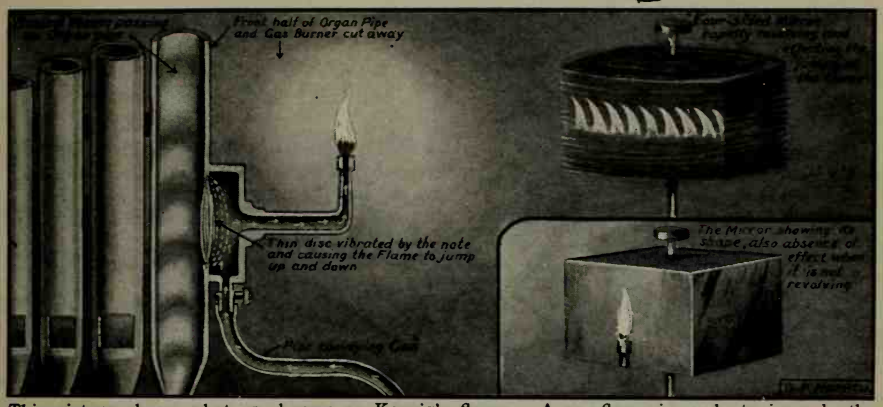
I may be believed or not, but I know that I have made a journey of twenty thousand leagues under the sea.

WHAT IS THE FATE OF CAPTAIN NEMO AND HIS MARVELOUS SUBMARINE?

Does the Nautilus still exist? Is Captain Nemo still alive? Was that awful night in the Maelstrom his last, or is he still pursuing a terrible vengeance? Will the confessions of his life, which he told me he had written, and which the last survivor of his fellow-exiles was to cast into the sea in an air-tight case, ever be found?

This I know, that only two men could have a right to answer the question asked in the Ecclesiastes three thousand years ago: "That which is far off and exceeding deep, who can find it out?" These two men are Captain Nemo and I.

THE NEXT FAMOUS BOOKS ARE ON PAGE 5169.


Front half of Organ Pipe and Gas Burner cut away
Thin disc vibrated by the note and causing the Flame to jump up and down
The Mirror showing the Shape, also absence of effect when it is not revolving

This picture shows what are known as Koenig's flames. A gas-flame is made to jump by the vibrations of a disc, set in motion by the sound waves of a musical note or notes. A four-sided mirror is kept revolving, and in this the jumping flame can be seen as a succession of tongues.

THE BEHAVIOR OF A SOUND

CONTINUED FROM 4908

WE often speak of the color of the voice, or we sometimes say that a singer uses a very white tone, by which we mean a tone which has very little color in it. The singer is not using his resonators —about which we read on page 4096 —to give color to the tone, but is letting it come from his vocal cords almost unchanged. Sometimes, also, we talk about the tone of a voice or an instrument as being cold or warm; or we make a comparison with the feel of things, as when we say that a voice is rough, or harsh, or smooth.

We must always remember that this is quite distinct from mere loudness. It is possible to speak or sing harshly without making much noise, and to speak quite loudly to a number of children, or to sing loudly, and yet have the tone soft, smooth, sweet, and warm. These terms of comparison are interesting, because they show how we are prone to compare our senses and liken our sensations one to another.

Now let us go a little more carefully into the question of over-tones, or harmonics, about which we read on page 4908. We can study it very well by simply taking a single string stretched between two points over a sounding-board. That is practically the same as a violin with a single string. Now, everyone knows that a violin string may be sounded by being plucked with the finger, or by being bowed—that is, played with a bow—and we all know that the kind of sound produced by bowing is quite different from the sound produced by plucking.

This is quite apart from the length of the sounds, for a clever violinist can produce exceedingly short sounds with his bow, and yet these, though of the same pitch and loudness and length as when the string is plucked, are utterly different in quality. We know already that this difference must be a difference in the matter of over-tones, and so it is.

Our ears tell us that the sound made by the bow is far richer and more lovely than the sound made by plucking, and this is because the bowing throws the string into vibrations in little pieces, so to speak, as well as over its whole length. These partial vibrations produce the over-tones which make the richness of the sound. So here we observe that a string behaves in two very different ways, according to the two ways in which it can be made to vibrate. When a piano string or a violin string is struck or plucked, there

is produced what is called a free vibration. The string is disturbed for a moment, and then the thing which disturbs it is removed, and the string vibrates freely for a longer or shorter time, the vibration lasting a long time in the case of a piano, a short time in the case of a violin.

WHAT THE TUNER DOES WHEN HE TUNES THE PIANO

In a piano, for instance, the strings are always meant to be played in this way, and everything is done to make the tones as rich in over-tones as possible, even though they belong to the class of free vibrations. A resonator is anything that gives back sympathetic vibrations to any particular tone, and helps to magnify the sound, as we read on page 3774. But quite apart from the question of resonators, the kind of string makes a great difference. We know that the pitch of a note depends upon the tightness of the string, which is what the tuner corrects when he tunes the piano; it depends also upon the mass of the string and upon its length.

Plainly, therefore, it should be possible to get one and the same note from a long thin string and from a short thick one, and this can actually be done; or, rather, it will be one and the same fundamental note in both cases, but there is a great difference when it comes to the question of over-tones. Then we find that, though the two strings produce the same fundamental note, it is a far more beautiful and richer note when it comes from a longer, thinner string than when it comes from a shorter, thicker one.

Everyone knows how utterly different is the sound of the bass notes of a good piano and the same notes of a cheap one. One of the chief differences is that the good piano uses longer wires for the low notes, and that is the reason why it takes up so much room.

WHY A GOOD PIANO MAKES BETTER MUSIC THAN A BAD ONE

Yet two pianos that are of the same size may be very different in the quality of their lower notes, and when we open the pianos we find that in the better one the longer wires have been run at an angle across the shorter ones, and so greater length has been obtained. That is what is meant when it is said that a piano is over-strung, as all but the cheapest pianos are nowadays. The point about over-stringing is to get length of string, and the point about length of string is that this is the best way of making low notes, as long, thin strings produce far more over-tones than short, thick ones.

It is very difficult to say exactly what happens when a string vibrates and produces over-tones. We know that, in the first place, the whole string is swinging from side to side, and then it seems that, on the top of that swing, so to speak, various sections of the string—as, for instance, just one-half of it, just one-quarter of it, and so on—are also making little swings of their own, each of a certain rate, according to the length of string that is swinging, and this is how the over-tones are made. This gives us some kind of idea why it is that in a very short, thick thing like a tuning-fork we get no over-tones, while from a long, stretched, slender string we get many.

THE FIDDLE STRING THAT CAN BE MADE TO LAUGH OR CRY

When a string is bowed, it is made to vibrate in a different way, and in this case it vibrates only when the bow is being drawn across it, and stops immediately afterwards. It only vibrates when the bow forces it to do so, and so these are called forced vibrations, as distinguished from free vibrations. A string undergoing forced vibrations must really be one of the most wonderful things in the world, if we could only see what is really happening to it.

The difference between a great violinist and a poor one is about as great as can be, and this is true though the violins may be the same. The secret lies in the bowing of the great player. When he plays a single, long note, it is a single note, and yet it is many notes; he can make it cry or rejoice as he draws the bow across the string.

The reason is to be found in the extraordinary sensitiveness of a string undergoing forced vibration. Changes in what the bow does to the string, so minute that no one can describe them or define them, or say where they begin or end, or what they consist of, will utterly change the quality of the sound. The reason, of course, is that the string is vibrating in a different way, and so is

producing a different set or a different proportion of over-tones in addition to its own proper note, which does not change except when the string is stopped. And the virtue of the good violin is that the body of it is somehow so made as to respond to the behavior of the string as sensitively as the string responds to the behavior of the bow.

AN EXPERIMENT THAT YOU CAN MAKE FOR YOURSELF ON THE PIANO

There is a very interesting experiment which anyone can make with a good piano. As a rule, when we strike a note on the piano, none of the other notes has much chance to sound, because the dampers are resting on them and keeping them quiet. When we hold a note down, we raise the damper.

Let us, then, hold down the following notes, not striking them, but simply raising the damper, so that if anything makes the string vibrate, it shall be free to do so: C in the bass clef, the C above that, the E, G, and B flat above that. When we have done this, let us strike loudly the low C below the bass clef, and let it go. If it is a good piano, we shall now hear a soft, sweet chord made up of the five notes which we have held down, but which we did not strike. Something has struck them, and the explanation of this is very interesting.

The first part of the explanation is that the low, long string which we did strike vibrated not only as a whole, producing the note proper to itself, but also in a number of pieces of various lengths corresponding, as it happens, to the five notes which we had previously held down. When the note is struck in the ordinary way, these over-tones can only be separately distinguished by well-trained ears, but we have made them stand out in our experiment, because we stopped the loud note when we let go the key we struck.

WHY THINGS JINGLE WHEN WE PLAY THE PIANO

This did not stop everything, because when the air waves that made the over-tones came each against the piano string that corresponded to the particular over-tone, that string was thrown into what is called sympathetic vibration. Other strings are not affected because they cannot vibrate at that particular rate; but sympathetic vibration means that waves traveling at any rate will set vibrating anything that can vibrate at the same rate. This is the reason why things jingle when we play the piano. This instance of sympathetic vibration will help us to understand the behavior of resonators, and the reason why it makes so very much difference to a violin whether it was made by Stradivarius or by an inferior maker. To begin with, we know that some things will resonate and others will not. A clock or a watch has a very different tick when laid on a hard table from what it has when put on cotton-wool; and when we want to hear a tuning-fork well, we do not hold it in the air, but press the stem against something firm and hard.

We know that the strings of a violin without the body make very poor sounds, and it is astonishing to discover how poor the sound of a piano string is outside the piano; so also the vocal cords of animals by themselves make hardly any sound at all, and that sound is very unpleasant.

THE BEHAVIOR OF A NOTE OF MUSIC OVER A PITCHER OF WATER

But this must not lead us to suppose that one resonator is as good as another. On the contrary, there are special rates of vibration to which special resonators can respond—rates to which they are sympathetic, we might say, as we saw in the case of the sympathetic vibration of the piano wires. If we take a long vessel, filled with water up to a certain height, and then sound a tuning-fork and hold it over the vessel, we may find that the sound is immensely enriched and increased. If now we add a little to the water, or pour a little out, holding the tuning-fork over the vessel makes no difference in the sound, or only very little.

In this way it is possible to make various kinds of instruments, consisting of a number of resonators arranged in an orderly way. If we have little flames opposite the mouths of these resonators, the flames will flicker when the corresponding resonators are vibrating, and only then. So we can see the over-tones, in a sense, and thus can find them out, even though we may be unable to detect them by means of our ears. This is called the tuning of resonators, and the first man who really studied it was a great German named Helmholtz.

But the tuning of resonators really dates from before the days of Helmholtz,

though he knew what he was doing, and we, as we tune our resonators every day, which we do, do not know what we are doing. Wonderful though other musical instruments are, and more especially the violin, which, in the hands of great masters, can be made almost human, the voice really beats them all, and the reason is that no other instrument has ever been invented in which we can tune the resonators as we go along. As is the case with everything else in the universe, a resonator creates nothing. It only makes more conspicuous what is already there.

THE WONDERFUL CORDS OF THE HUMAN VOICE

In our experiment with the piano, the soft chord we heard really came, in the first place, from the wire which we struck; and, similarly, all the over-tones of the human voice, whether in speaking or singing, are produced by the vocal cords. The marvelous richness in over-tones of the vibrations of the vocal cords is made yet more marvelous by the fact of their extreme shortness. The vocal cords of a bass singer—say, roughly, an inch long—may rival in number and richness of over-tones a violin string many inches long, or a piano string many feet long. Of course, the fact has to be remembered that the vibrations of the vocal cords are forced vibrations, and we know that, other things being equal, forced vibrations are always richer in over-tones than free vibrations. No instrument can make music so marvelous as that of the voice.

The chest and the cavities of the mouth and nose make the resonators for the voice, and these differ from all others in that they can be changed from moment to moment, and changed appropriately. For the lower notes the principal resonator is the chest, and its use is in reinforcing the lower over-tones. It does this best when it is well expanded, and therefore a singer produces far more resonant low notes when there is plenty of air in his lungs than when the air is nearly all expelled.

A GREAT SINGER'S MARVELOUS POWER OVER LANGUAGE

But all the different qualities of tone which decide what vowel the singer is singing, and, apart from that, control so much the quality of the voice and its effect upon our minds, are due to the higher over-tones. These are affected by the upper resonators, the shape of which we can instantly control within such a wide range. From the practical point of view, the power of tuning our resonators is of the greatest importance, because it gives us the power of producing different vowels. Therefore, all the difference between the lowest types of human language, which practically consist of consonants only—we may almost say of nothing but clicks and snorts and coughs, if not sneezes—and the higher types of language, rich in vowel sounds, is due to the laws of resonators and the fact that we can tune our resonators as we please.

The good singer goes even farther than the highest language in this respect: he does everything that the language does, and more. It is true that the bad singer often spoils the vowels, and makes them all nearly alike. By so doing he prevents us from understanding the words he sings, and he also loses all the value of the variety in vowel tones.

THE MANY THINGS THAT GO TO MAKE A GOOD SINGER

The good singer not only uses variety and makes the most of it, sounding his vowels much more purely than most of us do when we speak, but he also tunes his resonators from moment to moment, so as to make the tone cold or warm.

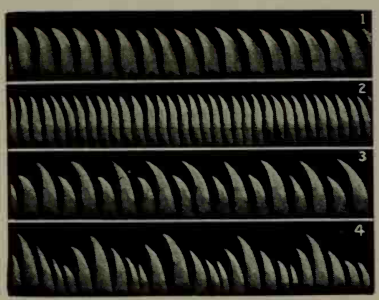
For this purpose he uses everything that is at his disposal for tuning his resonators. The extent to which the mouth is opened, the exact position of the lips, of the tongue, and of every part of the throat, from its roof downwards—all these modify the tuning of the upper resonators, and are under the perfect and easy control of the great singer.

It is not by any means only stretched strings that produce over-tones. The same is true of pipes, such as the pipes of an organ, a flute, a clarionet, or a bassoon. These vary very much in the quality, and the variations are due to the differences in the over-tones. In each case the column of air in the pipe is not only vibrating as a whole from end to end, but also in sections, and thus the over-tones are produced.

For the sake of curiosity we may study the behavior of such a thing as a plate. Many years ago, careful study was made of plates clamped in the middle, and then made to vibrate by

having a violin bow drawn across the edge. If some fine sand be spread over the plate, we notice that when the bow is drawn the sand is thrown into certain patterns, like the patterns produced by the voice, which are shown on page 4092. These patterns will change according to circumstances; as, for instance, when the bowing is done rather differently.

Now, we can readily understand that the sand will be thrown from the part of the plate which is vibrating most and will tend to be heaped up on the part which is moving least, wherever that may be. We find, then, that in every case there are certain definite lines upon the plate which are moving least, and on which the sand becomes heaped. These points are called *nodes*, from a Latin word really meaning knots. But the importance of nodes is not entirely due to the fact that we find them in the case of plates. When we carefully examine a stretched string which has been made to vibrate we find that there are certain places along the length of the string where it moves least, and these are the nodes. We know that the string is always moving as a whole; but, apart from that, it is also moving in pieces, producing the over-tones, and these pieces lie between the places where the nodes form. The simplest and commonest over-tone in the case of any string is, we find, one that is just an octave higher than the fundamental note.



Here we see the appearance of the changes in a flame as the sound waves of different notes play upon it. In picture 1 the note played is C; in 2 it is C an octave higher; in 3 the two C's are played together; and in 4 C and E are played together as a third.

We have already learned the rule about the vibration of a string, that the shorter it is the quicker it vibrates, other things being equal. So when the over-tone is an octave above the fundamental tone, it must be that the string is vibrating in half its length, as well as its whole length. Half the length will mean double the number of vibrations in each second, and that will just make the octave. We should expect, then, to find a node formed half-way along the string, and so it is. Other nodes also form, corresponding to the particular over-tones in each case. Under proper conditions we can actually see these nodes when a stretched string vibrates. Of course, in the case of very high over-tones, it must mean that the string is being cut up, so to speak, into a large number of small lengths, small enough to correspond to the high pitch of the over-tone; and this is so. The higher the over-tone the larger is the number of vibrating pieces into which the string is broken, and the smaller is the range of the to-and-fro swing of each segment.

We know that the loudness of a sound depends upon the width, or *amplitude*, as it is called, of the swing of the air waves, and that depends, of course, upon the width of the swing of the thing that makes the air waves. So, in this case, we should expect that if the swing of the pieces of the string grows smaller the shorter they are, the over-tones must become fainter the higher they are, and that is exactly what happens. We must not allow our minds to be confused with the idea that somehow or other it is possible for any particles of air or any parts of a string to be in two places at the same time. Of course, we know that this cannot happen. So, when a string is vibrating so as to produce both a fundamental note and also several over-tones, it is not really doing any of the things that we fancy it does, but something which is the result of all of them. No part of it can be in two places at the same time, and the actual movement of the string is an immensely complicated one. So, also, are the waves of air produced by this motion.

This becomes still more extraordinary and difficult to understand when we try to imagine how complicated must be the sound waves produced when a number of instruments and voices are all sounding together. The wave which reaches the ear is an immensely complicated sort of blend, or compromise, between all the different kinds of waves that have been produced. A very interesting way of studying sound waves is to be found in the phonograph, about which we read in another part of this book, and which was at first little more than a toy. But

we can make the phonograph record the waves corresponding to an orchestra or to any kind of sound, simple or complicated, music or mere noise, and the marks made upon the wax by the phonograph needle can be studied by means of the microscope, or they can be photographed, and greatly magnified.

THE FLAME THAT DIES WHEN WE SAY OO AND JUMPS WHEN WE SAY EE

This makes one way in which we can study sound by turning it, so to speak, into something that can be seen. We saw this, also, in the case of the flames which were made to flicker when the resonators opposite them were thrown into action. Flames can be made extraordinarily sensitive to sounds; we cannot say that the flame hears the sound, but it is somehow affected by the quality of the sound waves.

Professor Tyndall invented what he called a vowel flame, which, when nothing disturbs it, is about two feet high, but certain sounds will make it so short that it can scarcely be seen, and then, when the particular sound stops, up it will jump again. It is called a vowel flame because it can tell one vowel from another, so to speak. The flame is specially sensitive to high notes, and is therefore much more affected by vowels which are made by high over-tones than by those which have lower over-tones.

The highest pitched of the vowels is e. Anyone will agree with this who will whisper the various vowels all on the same note, and there will be no doubt that though they are all on the same note, yet e is the highest of them all. The reason is that, though the fundamental note is the same for each of the vowels as we are whispering them, the over-tones of e are the highest. Now, if we say oo, as in boot, to the vowel flame, it will do very little; but if we say ee to it, as in feet, it will almost disappear. When we stop, it jumps up again.

HOW MEN CAN WATCH A SOUND PLAYING WITH FIRE

Sensitive flames can be used for more strictly scientific purposes. We have seen already that they can be made to show which of a set of resonators are being thrown into action by a certain sound. This test can be applied to the study of sounds, notably to the study of the vowel sounds, which are more numerous than may be supposed by anyone who speaks only one language. When we learn French we all know how different some of the vowel sounds are, and really the total number of possible vowel sounds is quite large. This is all a matter of over-tones, and they can be studied by speaking into a little machine in such a way as to affect a flame, and we can study the shape which the flame takes in different cases. In fact, we may say that we can actually watch a sound playing with fire! There is a likeness between the shape of the flame in such cases and the shapes of the marks which the same sound will make on wax by means of the phonograph.

When a wave strikes a breakwater and comes back again and meets the next wave, the two will clash and interfere with each other. At times the two crests will come together and will make a very high crest; at other times the crest of one wave will meet the trough of another, and each will tend to spoil the other. This effect of one wave on another is called interference, and it is true of all kinds of waves—water waves, sound waves, even the ether waves that make light.

WHAT WE CAN LEARN BY THROWING A STONE INTO A POND

If the sea and a breakwater are not convenient, we can study interference in a small way by throwing two stones into a pond, or two small balls into your bath-tub, and seeing what the one set of waves does to the other.

Interference in sound waves produces a most interesting result. It means that if we have two notes sounding together that are very near in pitch, but not the same, the waves will interfere with each other, and we shall get what is called beats; the sound will seem to throb, or beat. When the two waves are helping each other, the sound gets louder; when they are spoiling each other the sound is fainter. This beat is very unpleasant.

Part of the objection to what we call discord is that the waves which are being made by the various notes are capable of interfering with each other, and so we get beats, or throbs. But different people vary very much as to what they find nice in the way of discords, and the right use of certain discords in music is invaluable because it so enormously increases the effect of the harmony upon our ears.

THE NEXT PART OF THIS IS ON PAGE 5163.

WITH BIG TIN TRUMPET AND LITTLE RED DRUM, MARCHING LIKE SOLDIERS THE CHILDREN COME

Sound, sound the clarion, fill the fife!
To all the sensual world proclaim

One crowded hour of glorious life
Is worth an age without a name

A HUMOROUS AMERICAN POEM

OLIVER WENDELL HOLMES (1809-1894), our well-beloved poet, was the author of many delightfully amusing poems. Perhaps no example of his verse has proved more popular than this diverting story of the wonderful two-wheeled carriage, or chaise—which was often called a "shay"—built by "the Deacon" in 1755, and driven a hundred years before it came to pieces. A curious part about "the Deacon's masterpiece," as this marvelous carriage was called, was that it came into being, so to speak, at the time of an earthquake and held on bravely for a century, only going to pieces when another earthquake occurred! The whole poem is, of course, a characteristic piece of light-hearted humor.

THE WONDERFUL ONE-HOSS SHAY

CONTINUED FROM 4982

HAVE you heard of the wonderful one-hoss shay,
That was built in such a logical way?
It ran a hundred years to a day,
And then, of a sudden, it——Ah, but stay, [delay:
I'll tell you what happened without
Scaring the parson into fits,
Frightening people out of their wits—
Have you ever heard of that, I say?

Seventeen hundred and fifty-five,
Georgius Secundus was then alive—
Snuffy old drone from the German hive.
That was the year when Lisbon town
Saw the earth open and gulp her down,
And Braddock's army was done so brown,
Left without a scalp to its crown.
It was on the terrible earthquake day
That the Deacon finished the one-hoss shay.

Now, in building chaises, I tell you what—
There is always *somewhere* a weakest spot!
In hub, tyre, felloe, in spring or thill,
In panel or crossbar, or floor or sill,
In screw, bolt, thoroughbrace, lurking still;
Find it somewhere you must and will—
Above or below, or within or without—
And that's the reason, beyond a doubt,
That a chaise *breaks down* but doesn't *wear out.*

But the Deacon swore—as Deacons do,
With an "I dew vum" or an "I tell yeou"—
He would build one shay to beat the taown,
'N' the keounty, 'n' all the kentry 'raoun;
It should be so built that it *couldn't* break daown,
"Fur," said the Deacon, "it's mighty plain
Thut the weakes' place mus' stan' the strain;
'N' the wayt' fix it, uz I maintain,
Is only jest
T' make that place uz strong uz the rest."

So the Deacon inquired of the village folk
Where he could find the strongest oak,
That couldn't be split, nor bent, nor broke—
That was for spokes, and floor, and sills;
He sent for lancewood to make the thills;
The crossbars were ash, from the straightest trees;
The panels of whitewood, that cuts like cheese
But lasts like iron for things like these;
The hubs of logs from the "Settler's ellum"—
Last of its timber they couldn't sell 'em—
Never an axe had seen their chips,
And the wedges flew from between their lips,
Their blunt-ends frizzled like celery-tips;
Step and prop-iron, bolt and screw,
Spring, tyre, axle, and linchpin, too,
Steel of the finest, bright and blue;
Thoroughbrace, bison skin, thick and wide;
Boot, top, dasher, from tough old hide
Found in the pit when the tanner died.
That was the way he "put her through."
"There!" said the Deacon. "Naow she'll dew!"

Do! I tell you, I rather guess
She was a wonder, and nothing less!
Colts grew horses, beards turned grey,
Deacon and deaconess dropped away,
Children and grandchildren—where were they? [shay,
But there stood the stout old one-hoss
As fresh as on Lisbon earthquake day.

Eighteen hundred—it came and found
The Deacon's masterpiece strong and sound.
Eighteen hundred, increased by ten—
"Hahnsum kerridge" they called it then.
Eighteen hundred and twenty came—
Running as usual, much the same.
Thirty and forty at last arrive,
And then came fifty and *fifty-five.*

Little of all we value here
Wakes on the morn of its hundredth year
Without both feeling and looking queer.
In fact, there's nothing that keeps its youth,
So far as I know, but a tree and truth.
This is a moral that runs at large.
Take it; you're welcome—no extra charge.

First of November—the earthquake day;
There are traces of age in the one-hoss shay,
A general flavour of mild decay,
But nothing local, as one might say.
There couldn't be, for the Deacon's art
Had made it so like in every part
That there wasn't a chance for one to start.
For the wheels were just as strong as the thills,
And the floor was just as strong as the sills,
And the panels just as strong as the floor,

And the whipple-tree neither less nor more,
And the back crossbar as strong as the fore,
And spring and axle and hub *encore;*
And yet, *as a whole,* it is past a doubt,
In another hour it will be *worn out!*

First of November—'Fifty-five!
This morning the parson takes a drive.
Now, small boys, get out of the way!
Here comes the wonderful one-hoss shay,
Drawn by a rat-tailed, ewe-necked bay.
"Huddup!" said the parson. Off went they.

The parson was working his Sunday's text,
Had got to *fifthly,* and stopped perplexed
At what the—Moses—was coming next.
All at once the horse stood still,
Close by the meet'n'-house on the hill.
First a shiver, and then a thrill,
Then something decidedly like a spill,
And the parson was sitting upon a rock,
At half-past nine by the meet'n'-house clock,
Just the hour of the earthquake shock!
What do you think the parson found,
When he got up and stared around?
The poor old chaise in a heap or mound,
As if it had been to the mill and ground!
You see, of course, if you're not a dunce,
How it went to pieces all at once—
All at once, and nothing first,
Just as bubbles do when they burst.

End of the wonderful one-hoss shay!
Logic is logic—that's all I say.

BEDOUIN SONG

The intensity of the Arab's devotion may be a matter of fact, or may be doubted; but his flowery manner of expression is well suggested by Bayard Taylor in this song.

FROM the desert I come to thee
On a stallion shod with fire;
And the winds are left behind
In the speed of my desire.
Under thy window I stand,
And the midnight hears my cry:
I love thee, I love but thee,
With a love that shall not die
Till the sun grows cold,
And the stars are old,
And the leaves of the Judgment
Book unfold!

Look from thy window, and see
My passion and my pain;
I lie on the sands below,
And I faint in thy disdain.
Let the night-winds touch thy brow
With the heat of my burning sigh,
And melt thee to hear the vow
Of a love that shall not die
Till the sun grows cold,
And the stars are old,
And the leaves of the Judgment
Book unfold!

My steps are nightly driven,
By the fever in my breast,
To hear from thy lattice breathed
The word that shall give me rest.
Open the door of thy heart,
And open thy chamber door,
And my kisses shall teach thy lips
The love that shall fade no more
Till the sun grows cold,
And the stars are old,
And the leaves of the Judgment
Book unfold.

BREAK! BREAK! BREAK!

Few of the shorter poems of Lord Tennyson are more quoted than these very beautiful lines of his, in which he suggests so perfectly that undertone of melancholy which seems to tune our thoughts when we stand by the seashore on a grey day and listen to the solemn music of the waves.

BREAK, break, break,
On thy cold grey stones, O Sea!
And I would that my tongue could utter
The thoughts that arise in me.

Oh, well for the fisherman's boy,
That he shouts with his sister at play!
Oh, well for the sailor lad,
That he sings in his boat on the bay!

And the stately ships go on
To their haven under the hill;
But oh, for the touch of a vanished hand,
And the sound of a voice that is still!

Break, break, break,
At the foot of thy crags, O Sea!
But the tender grace of a day that is dead
Will never come back to me.

OVER THE HILL

Some charming poems by that writer of true genius, George MacDonald, appear in other parts of our book, and the following by him is very characteristic of his delicate fancy and tender feeling. How beautifully he suggests to the child-mind the wonder of this world and the glory of a world that is to be! A longer and considerably altered version of this poem has also been published under the title of "Tell Me."

"TRAVELER, what lies over the hill?
Traveler, tell to me:
I am only a child—from the window-sill
Over I cannot see."

"Child, there's a valley over there,
Pretty and wooded and shy;
And a little brook that says, 'Take care,
Or I'll drown you by-and-by!'"

"And what comes next?"—"A little town,
And a towering hill again;
More hills and valleys, up and down,
And a river now and then."

"And what comes next?"—"A lonely moor
Without a beaten way;
And grey clouds sailing slow before
A wind that will not stay."

"And then?"—"Dark rocks and yellow sand,
And a moaning sea beside."
"And then?"—"More sea, more sea, more land,
And rivers deep and wide."

"And then?"—"Oh, rock and mountain and vale,
Rivers and fields and men,
Over and over—a weary tale—
And round to your home again."

"And is that all? Have you told the best?"
"No; neither the best nor the end.
On summer eves, away in the west
You will see a stair ascend.

"Built of all colours of lovely stones—
A stair up into the sky,
Where no one is weary, and no one moans,
Or wants to be laid by."

"I will go."—"But the steps are very steep;
If you would climb up there,
You must lie at the foot, as still as sleep,
A very step of the stair."

A RED, RED ROSE

The following is one of the most beautiful of the many love-songs by Robert Burns. The style of the song is of an earlier day than his own, and different versions of it have been printed, but it is here given as it first appeared in a Scottish collection of songs to which the poet contributed.

O, MY luve's like a red, red rose,
That's newly sprung in June;
O, my luve's like the melodie
That's sweetly played in tune.
As fair art thou, my bonnie lass,
So deep in luve am I;
And I will luve thee still, my dear,
Till a' the seas gang dry.
Till a' the seas gang dry, my dear,
And the rocks melt wi' the sun;
I will luve thee still, my dear,
While the sands o' life shall run.
And fare thee weel, my only luve!
And fare thee weel a while!
And I will come again, my luve,
Tho' it were ten thousand mile.

WHAT I LIVE FOR

George Linnæus Banks, who was born in 1821 and died in 1881, was well known in his day as a poet and a writer, though the novels of his wife are now more read than his own writings. He was a man of lofty ideals, and endeavored by voice and pen to forward the education of his fellow-men, for he was an orator as well as a writer. Of his short poems the following is perhaps the best known, and it sums up the life-work of the true Christian. The last four lines form a favorite quotation with writers and speakers pleading for workers to come forward in any good cause.

I LIVE for those who love me,
Whose hearts are kind and true;
For the heaven that smiles above me,
And awaits my spirit too;
For all human ties that bind me,
For the task by God assigned me,
For the bright hopes left behind me,
And the good that I can do.

I live to learn their story,
Who've suffered for my sake;
To emulate their glory,
And follow in their wake;
Bards, patriots, martyrs, sages,
The noble of all ages,
Whose deeds crown history's pages,
And time's great volume make.

I live to hold communion
With all that is divine;
To feel there is a union
'Twixt Nature's heart and mine;
To profit by affliction,
Reap truths from fields of fiction,
Grow wiser from conviction,
And fulfil each grand design.

I live to hail that season,
By gifted minds foretold,
When men shall live by reason,
And not alone by gold;
When man to man united,
And every wrong thing righted,
The whole world shall be lighted
As Eden was of old.

I live for those who love me,
For those who know me true;
For the heaven that smiles above me,
And awaits my spirit too;
For the cause that lacks assistance,
For the wrong that needs resistance,
For the future in the distance,
And the good that I can do.

THE PASSIONATE SHEPHERD

Christopher Marlowe was born in 1564, the same year as Shakespeare, and died in 1593. He was one of the dramatists who made the reign of Elizabeth brilliant in English history. One of his best poems is "The Passionate Shepherd"—that is, the shepherd who was so deeply in love that he was willing to do all he could to make his sweetheart happy. The word "madrigals" means songs, and a "kirtle" was a kind of petticoat, usually of gay color, fine material, and beautiful embroidery, worn above the gown, or dress.

COME, live with me, and be my love,
And we will all the pleasures prove
That valleys, groves, and hills and fields,
Woods or steepy mountains yields.

And we will sit upon the rocks,
Seeing the shepherds feed their flocks,
By shallow rivers, to whose falls
Melodious birds sing madrigals.

And I will make thee beds of roses,
And a thousand fragrant posies;
A cap of flowers, and a kirtle,
Embroidered all with leaves of myrtle;

A gown made of the finest wool,
Which from our pretty lambs we pull;
Fair lined slippers for the cold,
With buckles of the purest gold.

A belt of straw and ivy-buds,
With coral clasps and amber studs;
And if these pleasures may thee move,
Come live with me and be my love.

The silver dishes, for thy meat,
As precious as the gods do eat,
Shall, on an ivory table, be
Prepared each day for thee and me.

The shepherd swains shall dance and sing
For thy delight each May morning.
If these delights thy mind may move,
Then live with me, and be my love.

THE LAND OF THUS-AND-SO*

That most charming of American poets, Mr. James Whitcomb Riley, is the only one whose poems of child-life rival those of the late Eugene Field. Nothing could be happier than the following verses from his pen, in which he describes an ideal land where all is right and nothing wrong, a land that all little folks have often heard about, but to which, like the sensible little folk they are, they have no immediate desire to hasten! The Land of Every-Day is quite a good enough land for any of us if we only behave ourselves, and though the "Land of Thus-and-So" is all very well to read about, a visit there might bring disappointment.

"HOW would Willie like to go
To the land of Thus-and-So?
Everything is proper there—
All the children comb their hair
Smoother than the fur of cats,
Or the nap of high silk hats;
Every face is clean and white
As a lily washed in light;
Never vaguest soil or speck
Found on forehead, throat, or neck;
Every little crimpled ear,
In and out, as pure and clear,
As the cherry blossom's blow
In the land of Thus-and-So.

"Little boys that never fall
Down the stairs, or cry at all—
Doing nothing to repent,
Watchful and obedient;
Never hungry, nor in haste—
Tidy shoe-strings always laced;

*From "Rhymes of Childhood," copyright, 1890, by special permission of the publishers, The Bobbs-Merrill Co.

Never button rudely torn
From its fellows all unworn;
Knickerbockers always new—
Ribbon tie and collar, too;
Little watches, worn like men,
Only always half-past ten—
Just precisely right, you know,
For the land of Thus-and-So!
"And the little babies there
Give no one the slightest care—
Nurse has not a thing to do
But be happy and say 'Boo!'
While mamma just nods, and knows
Nothing but to doze and doze;
Never litter round the grate;
Never lunch or dinner late;
Never any household din,
Peals without or rings within—
Baby coos nor laughing calls,
On the stairs or through the halls—
Just great Hushes to and fro
Pace the land of Thus-and-So!
"Oh, the land of Thus-and-So!
Isn't it delightful, though?"
"Yes," lisped Willie, answering me
Somewhat slow and doubtfully—
"Must be awful nice, but I
Rather wait till by-and-by
'Fore I go there—may be when
I be dead I'll go there then—
But——"the troubled little face
Closer pressed in my embrace—
"Let's don't never ever go
To the land of Thus-and-So!"

CORONATION*

This poem by Helen H. Jackson was written for the purpose of illustrating the ancient truth that an earthly crown may only be a symbol of a slave, while true freedom, both of mind and person, may be clothed with the poorest raiment.

AT the king's gate the subtle noon
Wove filmy yellow nets of sun;
Into the drowsy snare too soon
The guards fell one by one.
Through the king's gate, unquestioned then,
A beggar went, and laughed, "This brings
Me chance, at last, to see if men
Fare better, being kings."
The king sat bowed beneath his crown,
Propping his face with listless hand;
Watching the hour-glass sifting down
Too slow its shining sand.
"Poor man, what wouldst thou have of me?"
The beggar turned, and, pitying,
Replied, like one in dream, "Of thee,
Nothing. I want the king."
Up rose the king, and from his head
Shook off the crown and threw it by.
"O man, thou must have known," he said,
"A greater king than I."
Through all the gates, unquestioned then,
Went king and beggar hand in hand,
Whispered the king, "Shall I know when
Before *his* throne I stand?"
The beggar laughed. Free winds in haste
Were wiping from the king's hot brow
The crimson lines the crown had traced.
"This is his presence now."
At the king's gate the crafty noon
Unwove its yellow nets of sun;
Out of their sleep in terror soon
The guards waked one by one.
"Ho, here! Ho, here! Has no man seen
The king?" The cry ran to and fro;
Beggar and king, they laughed, I ween,
The laugh that free men know.
On the king's gate the moss grew grey;
The king came not. They called him dead;
And made his eldest son one day
Slave in his father's stead.

OLD CHRISTMAS

Mrs. Mary Howitt has captured in these jolly verses something of the spirit of old-fashioned Christmas—the time of good cheer, good-fellowship, and general kindness. "Old Christmas," we see, is not too old to take a vigorous part in merry-making; he is just as old or as young as we wish him to be, and, if our hearts are light and warm with kindness, we shall find him as young and as genial as any of us.

NOW, he who knows old Christmas,
He knows a carle of worth;
For he is as good a fellow
As any upon the earth.
He comes warm-cloaked and coated,
And buttoned up to the chin;
And soon as he comes a-nigh the door
We open and let him in.
We know he will not fail us
So we sweep the hearth up clean;
We set for him the old armchair,
And a cushion whereon to lean.
And with sprigs of holly and ivy
We make the house look gay,
Just out of old regard to him,
For 'twas his ancient way.
He comes with a cordial voice
That does one good to hear,
He shakes one heartily by the hand,
As he hath done many a year.
And after the little children
He asks in a cheerful tone,
Jack, Kate, and little Annie
He remembers them every one!
What a fine old fellow he is!
With his faculties all as clear,
And his heart as warm and light,
As a man in his fortieth year!
What a fine old fellow, in troth!
Not one of your griping elves
Who, with plenty of money to spare,
Think only about themselves.
Not he! for he loveth the children,
And holiday begs for all;
And comes with his pockets full of gifts
For the great ones and the small.
And he tells us witty old stories,
And singeth with might and main;
And we talk of the old man's visit
Till the day that he comes again.
And all the workhouse children
He sets them in a row,
And giveth them rare plum-pudding,
And twopence apiece also.
He must be a rich old fellow—
What money he gives away!
There's not a lord in England
Could equal him any day!
Good luck unto old Christmas,
And long life, let us sing,
For he doth more good unto the poor
Than many a crownèd king!

*This poem appears by permission of the publishers, Messrs. Little, Brown & Co.

IT IS COMMON

The anonymous American poet who has written these lines expresses a thought that has often arisen in the poems we have read: that the best things of this life are really the commonest, if we could only be persuaded of this. The word "fall" in the first line of the fourth verse is oftener used in America than elsewhere as another name for autumn—the time when the falling leaves cover the woodland.

SO are the stars and the arching skies,
So are the smiles in the children's eyes;
Common the life-giving breath of the spring;
So are the songs which the wild birds sing—
Blessed be God, they are common!

Common the grass in its glowing green;
So is the water's glistening sheen;
Common the springs of love and mirth;
So are the holiest gifts of earth.

Common the fragrance of rosy June;
So is the generous harvest moon,
So are the towering, mighty hills,
So are the twittering, trickling rills.

Common the beautiful tints of the fall;
So is the sun which is over all.
Common the rain with its pattering feet;
So is the bread which we daily eat—
Blessed be God, it is common!

So is the sea in its wild unrest,
Kissing for ever the earth's brown breast;
So is the voice of undying prayer,
Evermore piercing the ambient air.

So unto all are the "promises" given,
So unto all is the hope of heaven;
Common the rest from the weary strife,
So is the life which is after life—
Blessed be God, it is common.

ALL THE CHILDREN

These merry verses bear no author's name, but are possibly of American origin. Whoever wrote them had a happy touch of humor and must have loved the little ones, if we may judge by the pretty things he, or she, says about them.

I SUPPOSE if all the children
Who have lived through the ages long
Were collected and inspected,
They would make a wondrous throng.
Oh, the babble of the Babel!
Oh, the flutter and the fuss!
To begin with Cain and Abel,
And to finish up with us.

Think of all the men and women
Who are now and who have been—
Every nation since creation
That this world of ours has seen,
And of all of them, not any
But was once a baby small;
While of children, oh, how many
Have not grown up at all!

Some have never laughed or spoken,
Never used their rosy feet;
Some have even flown to heaven
Ere they knew that earth was sweet;
And, indeed, I wonder whether,
If we reckon every birth,
And bring such a flock together,
There is room for them on earth.

Who will wash their smiling faces?
Who their saucy ears will box?
Who will dress them and caress them?
Who will darn their little socks?
Where are arms enough to hold them?
Hands to pat each shining head?
Who will praise them? Who will scold them?
Who will pack them off to bed?

Little happy Christian children,
Little savage children too,
In all stages, of all ages
That our planet ever knew;
Little princes and princesses,
Little beggars, wan and faint,
Some in very handsome dresses,
Naked some, bedaubed with paint.

Only think of the confusion
Such a motley crowd would make,
And the clatter of their chatter
And the things that they would break!
Oh, the babble of the Babel!
Oh, the flutter and the fuss!
To begin with Cain and Abel,
And to finish up with us.

A STORY OF LIFE

Jean Ingelow, the English poetess who wrote the famous ballad "High Tide on the Coast of Lincolnshire," was the author of this plaintive little summary of a human life.

SWEET is childhood; childhood's over,
Kiss and part.
Sweet is youth; but youth's a rover—
So's my heart.
Sweet is rest; but all by showing
Toil is nigh.
We must go. Alas! the going,
Say, "Good-bye."

A VISION OF THE FUTURE

The following is a short extract from Tennyson's famous poem of "Locksley Hall," and is quoted here as appropriate to these days of ours, when the wonder-ships that can sail the skies have actually come to pass. Perhaps the day may not be so very far distant when those greater wonders of the poet's imagination may yet be realized.

FOR I dipt into the future, far as human eye could see,
Saw the Vision of the world, and all the wonder that would be;
Saw the heavens fill with commerce, argosies of magic sails,
Pilots of the purple twilight, dropping down with costly bales;
Heard the heavens fill with shouting, and there rained a ghastly dew
From the nation's airy navies grappling in the central blue;
Far along the world-wide whisper of the south wind rushing warm,
With the standards of the people plunging thro' the thunder-storm;
Till the war-drum throbbed no longer, and the battle-flags were furled
In the Parliament of man, the Federation of the world.
There the common-sense of most shall hold a fretful realm in awe,
And the kindly earth shall slumber, lapt in universal law.

GENTLE JESUS, MEEK AND MILD

This tiny hymn for little children was written by Charles Wesley about the year 1740, and is now the only one of his children's hymns sung in our churches to-day. It has been said that he wrote it for his own children; but this cannot be correct, as he did not marry until long afterwards.

GENTLE JESUS, meek and mild,
Look upon this little child;
Pity my simplicity,
Suffer me to come to Thee.

Fain I would to Thee be brought,
Gracious God, forbid it not;
In the kingdom of Thy grace
Grant Thy little child a place.

AN INCIDENT IN A RAILROAD CAR

The friendship of poets, and poets' praise of other poets, have produced many charming and tender verses that are among the treasures of our poetry. For there is nothing so humanly attractive as the honest admiration of one man of genius for another. One of the best things which Bret Harte wrote was his famous poem "Dickens in Camp," in which he praises the magic power of the great story-teller. But all great poets and authors, from Homer to Robert Louis Stevenson, have inspired other poets to sing of them. To Shakespeare and Burns how many poems have been inscribed! This poem by James Russell Lowell, our famous American poet, is one of the finest tributes ever paid to the genius of Scotland's greatest poet, Robert Burns.

HE spoke of Burns: men rude and rough
Pressed round to hear the praise of one
Whose breast was made of manly, simple stuff,
As homespun as their own.

And, when he read, they forward leaned,
And heard, with eager hearts and ears,
His birdlike songs whom glory never weaned
From humble smiles and tears.

Slowly there grew a tender awe,
Sunlike o'er faces brown and hard,
As if in him who read they felt and saw
Some presence of the bard.

It was a sight for sin and wrong
And slavish tyranny to see,
A sight to make our faith more pure and strong
In high Humanity.

I thought, these men will carry hence
Promptings their former life above,
And something of a finer reverence
For beauty, truth, and love.

God scatters love on every side,
Freely among his children all;
And always hearts are lying open wide,
Wherein some grains may fall.

There is no wind but soweth seeds
Of a more true and open life,
Which burst, unlooked for, into high-souled deeds
With wayside beauty rife.

We find within these souls of ours
Some wild germs of a higher birth,
Which in the poet's tropic heart bears flowers
Whose fragrance fills the earth.

Within the hearts of all men lie
These promises of wider bliss,
Which blossom into hopes that cannot die,
In sunny hours like this.

All that hath been majestical
In life or death, since time began,
Is native in the simple heart of all,
The angel heart of man.

And thus, among the untaught poor
Great deeds and feelings find a home,
Which casts in shadow all the golden lore
Of classic Greece or Rome.

O mighty brother-soul of man,
Where'er thou art, in low or high,
Thy skyey arches with exulting span
O'er-roof infinity!

All thoughts that mould the age begin
Deep down within the primitive soul,
And from the many slowly upward wing
To one who grasps the whole:
In his broad breast, the feeling deep
That struggled on the many's tongue
Swells to a tide of thought whose surges leap
O'er the weak thrones of wrong.

Never did poesy appear
So full of Heav'n to me as when
I saw how it would pierce through pride and fear,
To lives of coarsest men.

It may be glorious to write
Thoughts that shall glad the two or three
High souls like those far stars that come in sight
Once in a century.

But better far it is to speak
One simple word which now and then
Shall waken their free nature in the weak
And friendless sons of men;

To write some earnest verse or line
Which, seeking not the praise of art,
Shall make a clearer faith and manhood shine
In the untutored heart.

"FIDDLE-DEE-DEE!" *

The unfailing charm of Eugene Field's poems about little folk has been one of the features of our BOOK OF POETRY. If we were to ask for a show of hands from all the boys and girls who have delighted in his quaint humor and tuneful rhymes, it would be a case of "all hands up." In these verses he is laughing, in his sly way, at the "little soldier of four," and we are happy to think that the bird on the tree is also laughing at the valiant marksman!

THERE once was a bird that lived up in a tree,
And all he could whistle was "Fiddle-dee-dee!"—
A very provoking, unmusical song
For one to be whistling the summerday long!
Yet always contented and busy was he
With that vocal recurrence of "Fiddle-dee-dee!"

Hard by lived a brave little soldier of four.
That weird iteration annoyed him so sore;
"I prithee, Dear-Mother-Mine! fetch me my gun,
For, by our St. Didy! the deed must be done
That shall presently rid all creation and me,
Of that ominous bird and his 'Fiddle-dee-dee'!"

Then out came Dear-Mother-Mine, bringing her son
His awfully truculent little red gun;
The stock was of pine and the barrel of tin,
The "Bang" it came out where the bullet went in—
The right kind of weapon, I think you'll agree,
For slaying all fowl that go "Fiddle-dee-dee!"

The brave little soldier quoth never a word,
But he up and he drew a straight bead on that bird;
And while that vain creature provokingly sang,
The gun it went off with a terrible bang!
Then loud laughed the youth, "By my Bottle!" cried he,
"I've put a quietus on 'Fiddle-dee-dee'!"

Out came then Dear-Mother-Mine, saying: "My son,
Right well have you wrought with your little red gun!
Hereafter no evil at all need I fear,
With such a brave soldier as You-My-Love here!"
She kissed the dear boy. The bird in the tree
Continued to whistle his "Fiddle-dee-dee!"

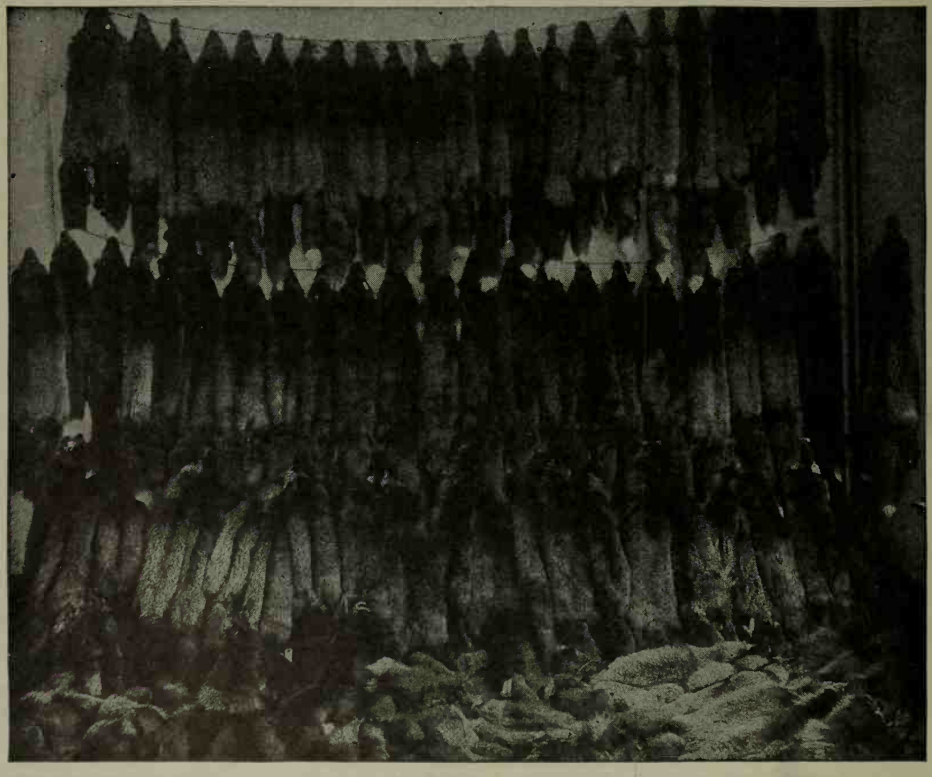
*From "Love Songs of Childhood," copyright, 1894, by Eugene Field, published by Charles Scribner's Sons.

THE BIRD THAT SANG "FIDDLE-DEE-DEE!"

The gun it went off with a terrible bang, but the bird in the tree continued to whistle his "Fiddle-dee-dee!"

THE END OF THE TRAIL

Dog sledges are used deep in the woods, but where the country is more open horses are also found at work. Here is a train nearing the outposts of civilization. These furs perhaps came from the wilds on dog sledges and will be transferred to railroad or steamer for another stage of their long journey.



This is a unique exhibit, the season's catch of silver fox, which is a rare animal. These skins shown here are worth an immense sum, perhaps $100,000, or even more. As you are told in the text, efforts are being made, in a number of places, to rear these beautiful animals in captivity for the sake of their furs.

Pictures by courtesy of Revillon Freres, New York.

The Buffalo, Which Once Furnished Many Carriage Robes.

WHERE DO ALL THE FURS COME FROM?

CONTINUED FROM 5048

WHERE do all the furs come from? This is a very natural question to ask, and the answer brings us in imagination to many strange places on the world's map. For instance the blue fox muff and collar that a school girl has set her heart on having, probably came from Alaska, or the Aleutian Islands; perhaps it may even have come from the Russian Arctic regions. Her friend's beaver muff came from Northern Canada. Her sister's chinchilla furs were brought from South America. The baby's warm silvery-white carriage robe is a lamb skin from Thibet. Her brother's nutria cap grew on the back of a rat-like animal in South America, and her mother's handsome coat of Hudson seal was made from the skins of muskrats, which were perhaps trapped in the swamps of New Jersey and Delaware.

WHEN FURS WERE FIRST WORN BY MAN

We all know, of course, that the earliest fur coats of all were worn by our primitive forefathers, who, for the sake of warmth, made rude garments from the skins of the animals that they killed for food, just as the Eskimos do to-day. By and by, however, when they had learned to keep domestic animals for food, men continued to hunt wild animals for the love of the chase, and, because of the beauty of the fur, they used the skins, taken from the wild animals, to ornament their dress.

In olden times some of the rarest and finest furs were kept for the use of the king, and his nobles. The regulations of the court and of the guilds described what the different orders of the nobility should wear, the dress of their retainers and the "livery" of the guilds. These days are gone, however. We can no longer tell from a passing glance at a man or his family what his profession or occupation may be. We may wear any kind of furs that our purses can buy, and the fur garments possessed by one family may have come from the different ends of the earth.

FUR HUNTING HAS LED TO DISCOVERY OF FERTILE LANDS

The best furs come from the skins of carnivorous animals, of the smaller kind, especially those that live in dense woods, in very cold climates. These animals are very wild, some of them are timid, and most of them have their haunts as far as possible from the dwellings of man. As the world has become more thickly populated, these animals have gone farther and farther back into the wilds. The trapper,

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the hunter and the trader have followed them, and the search for fine furs has led to the exploration of many lands, and the opening up of vast stretches of country for cultivation.

In another place we have read of the importance of the fur trade in the development of the Canadian nation. The same story is almost equally true of the settlement of the Mississippi Valley, of some of the northwestern states, and the region of Oregon and the state of Washington; and we are told that Russian fur hunters discovered the fertile Siberian lands.

During the warm season furs are worthless, because as summer approaches the fur-bearing animals shed their coats, or at least lose the finest and thickest parts. After November, when the animals put on their thick coats to protect them during the cold winter weather, and until the approach of the warm season, furs are said to be in their prime. As we go nearer the poles and the weather becomes more severe, the animals need more protection from the cold, and so we find their coats much thicker and consequently more valuable.

In the story of the Canadian Fur Traders we may read of the way in which the animals are trapped, and we may there gain an idea of the dangers and privations that are oftentimes experienced by the hunters. The story of the lives of the hunters in other places is almost the same and so we shall go on to think for a few minutes of the animals themselves, and the places in which they live.

Some furs come from settled countries

Although, as we have just read, the rarest furs come from very wild places, many wild animals are caught in the country around us. Muskrats, for instance, are found in nearly all of North America, and are trapped in immense numbers in New Jersey and Delaware swamps. Minks are caught in many of the states of the Union, and the best mink fur comes from the Maritime Provinces of Canada, especially from Nova Scotia. The raccoon is an animal of the temperate zone, and the best raccoon skins come from the northern states, where the winters are just cold enough to make the fur thicken up. The animal is not found far north of the Canadian boundary, and not many come from Canada. We might think that the thick fur of the opossum showed that it came from the north, but, curiously enough, the best opossum skins come from the woods in the mild Central and Southern parts of the United States. Many opossum skins come from Australia, but while the fur is close and warm, it is neither so handsome nor so durable as the American opossum and has quite a different appearance.

If the furs gathered together in a furrier's shop were able to speak, what wonderful tales they could tell of their travels, and the adventures of the men who went in search of them. Perhaps a pile of opossum furs may lie in the warehouse quite close to a pile of furs taken from black monkeys which were trapped by negroes in an African forest, and on a shelf above we may find soft gray chinchilla furs, which were trapped in the Andes, perhaps by descendants of the proud Incas of Peru.

From South America comes also the soft brown nutria that, after it has been dressed, looks so much like beaver. This fur is the skin of the coypu or nutria, an animal which looks like a beaver, but has a tapering rat-like tail. Since beaver fur has become scarce, nutria has been much used in its place, and sometimes, when dyed brown, it masquerades as Baltic seal.

Some beavers are found in Europe; but they are too few to be thought of as a source of fur supply. The best beaver comes from the woodland streams and lakes of Northern Canada, where it is trapped by Indians, or perhaps by French-Canadian or half-breed trappers. The story of the beaver is one of the tragedies of nature. Once on a time, these busy little creatures were found all over the continent of North America. The trade in beaver skins was so important that the beaver was placed on the coats of arms of New York City and of Ontario. But man is greedy. In their desire to supply the demand for the fur, trappers gave no thought to the destruction they were causing, and most of the beavers were killed off. South of the boundary line, a few are found in the Southern Appalachian Mountain region, and in the mountains of the far west. A few beavers are found in Siberia, but their fur does not reach this country.

SUMMER IN THE FUR COUNTRY

This steamer on the Athabasca River is carrying the furs nearer those who are to wear them. The boat, as shown by the name on the bow, is called the Midnight Sun. The smaller boats, which are being towed alongside, are loaded with furs, so that the boat brings down more than she could carry alone.

Here is another summer picture in fur-land. These campers have every convenience necessary, and there are many more unpleasant ways of spending a summer vacation than accompanying one of these parties on a tour of inspection. These trips provide a good means of studying the wild life of the country.

This party has struck on a sand bar on Lesser Slave Lake, Alberta, in the heart of Western Canada. The mosquitoes are sometimes troublesome, but otherwise these campers have little of which to complain. The lake is in the fertile Peace River district where fur trapping is giving place to farming.
Pictures by courtesy of Revillon Freres, New York.

BEAUTIFUL FURS FROM SIBERIA'S FROZEN LANDS

It is to Siberia, and the east of Russia, however, that we must go for the pretty gray squirrel fur that we use for coat linings and for muffs and collars for young girls. The woods of Siberia also give us the ermine that was once used only for the robes of kings, and of the high nobility. Louis IX of France, we are told, wrapped himself in a mantle in which three hundred and forty little ermine skins were used. The ermine, as we may read in another place, is a stoat, or weasel, and wears a brown coat in summer, but in winter turns white, except for the black tip of its tail. Sometimes the black tails are sewn on the ivory white of the winter fur, and in the stately language of Old World heraldry it is then known as miniver.

Siberia sends us, too, the other royal fur,—Russian sable,—which is also found in the woods of Northern Russia. Russian sable is the beautiful silky rich brown, or almost black fur of a species of marten, a very shy wild animal. The rich brown fur of the pine marten of Northern Canada, which is almost as fine as Russian sable, and the fur of the fisher, or Pennant's marten, found chiefly in Ungava, make very good substitutes for the more expensive Russian fur.

SEA ANIMALS WHOSE FUR COATS HAVE CAUSED THEIR DESTRUCTION

Even sable is not more beautiful than the coat of the sea otter, which lives only on the rocky coasts and islands of the North Pacific. When they were first discovered, large numbers of these animals were found, but so many were killed for the sake of their fur, that few are left, and it is feared that they may become extinct. The color of the fur is sometimes a pale grayish-brown, but the best skins are almost black. Sometimes the long hairs in these dark skins are tipped with silver, and then the fur is indeed worth a king's ransom. The long hairs of the sea otter are very soft and silky, and, unlike the skins of other water animals, they do not have to be plucked out when the fur is being prepared for use. The river otter is found everywhere in the rivers of Canada, and the United States. Its fur is much used, but its beauty is nothing like the beauty of the sea otter fur.

The beautiful coat of the fur seal was for many years the most fashionable for fur garments. Consequently the seals were killed in such numbers that it was feared that they would become extinct and even yet the danger of this catastrophe is not past. We may read the interesting story of their lives and the efforts that are being made to preserve them on page 1076.

Another name for the fur seals is the sea bears, but their silky coats do not look much like the rough coats of the land bears, from which we get warm carriage rugs, and heavy fur coats for cold regions. The best bear skins come from Northern Canada, and are fine enough to be made into muffs and boas. Bears are also hunted in the Rocky Mountains, in Russia, Siberia, and the Himalayas, and the fur of the white Arctic bear comes chiefly from Greenland's icy shores.

The lynx is found in the woods all over North America as far north as the forest regions extend, and some lynx fur comes from Northern Asia, and the Russian and Scandinavian woods. As we know, the lynx is a cat, and wild cat sometimes is called lynx, but its fur is not so long and silky. Lynx fur is generally dyed black before it is used.

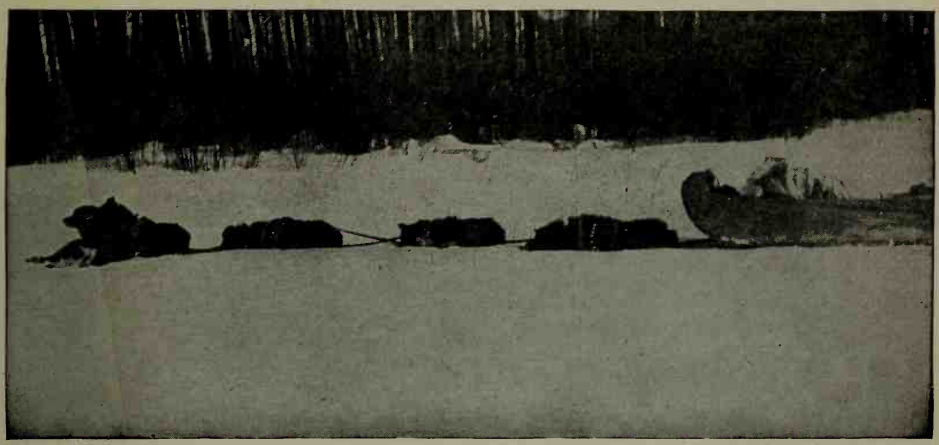
A great deal of black fur comes from the cat farms of Holland, Germany and Russia, where glossy-coated black cats are kept. Much of the black fur that we call coney is the dyed fur of rabbits from Australia and New Zealand, where the people have turned a pest into a source of profit.

Perhaps it may surprise you to hear that the best skunk furs come from New York State and Ohio. The skunks, which are related to the weasel family, are pretty little dark brown animals, some of them almost black. There are nine different species of this animal, all of them well-marked with white. Some have wide white stripes down the back, but others have only a few white hairs, and the fur of this species is most valuable.

THE FINE FUR OF FOXES COMES FROM MANY PLACES

Foxes give us several kinds of fine fur. Great quantities of the fur sold in the shops as black fox is red fox fur from Germany, Russia and Norway, which has been dyed. The best red foxes are caught in Northern Canada and Alaska, and often this fur is sold in its

HOW THE FURS ARE CARRIED



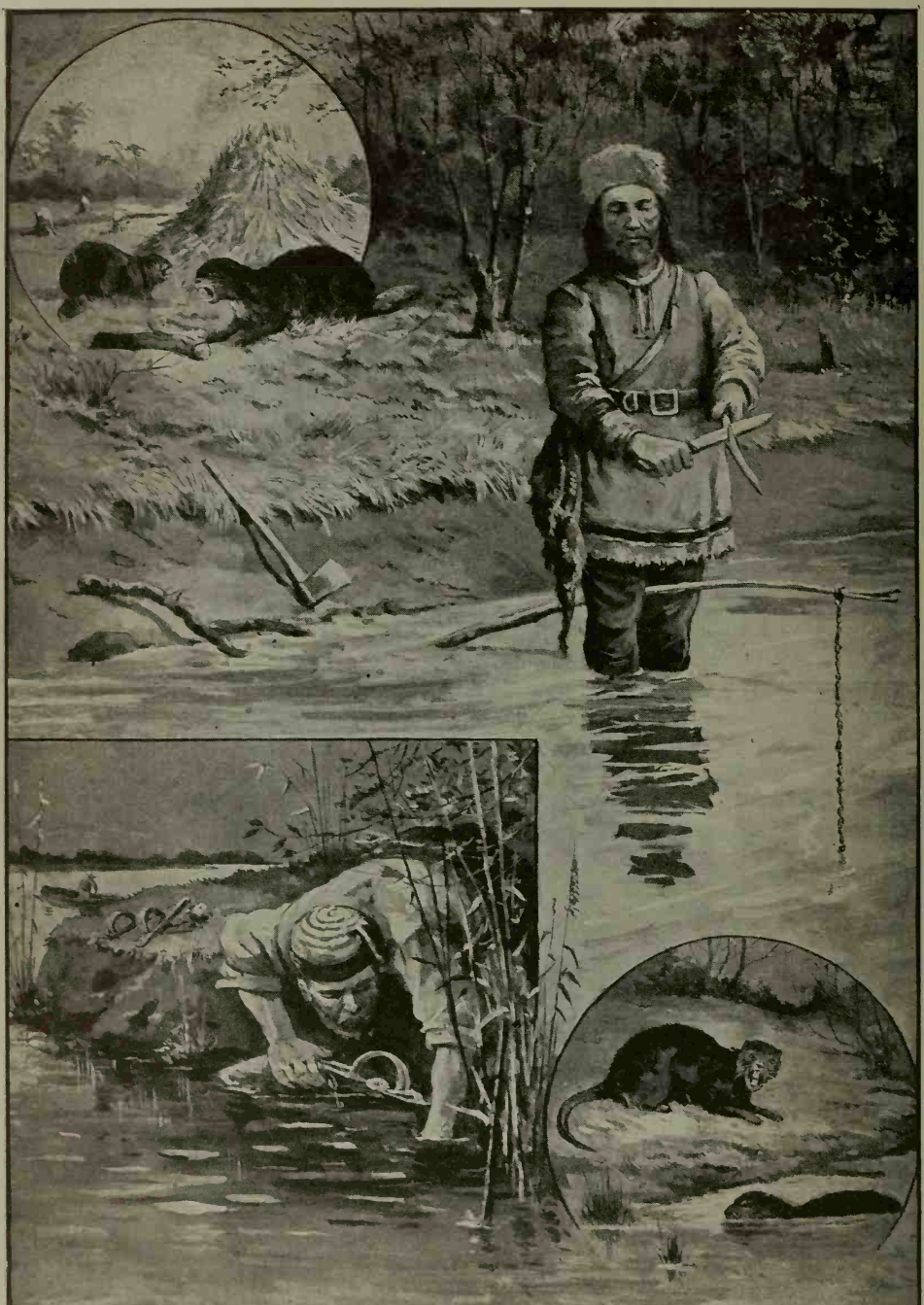
When the dogs, which pull the sledges, are tired, they are allowed to rest. You see them here in the snow. The men are preparing their dinner elsewhere. One can feel how cold it is, but the thick coats, which the dogs put on in winter, keep them quite comfortable. They look quiet here, but sometimes they have fierce fights among themselves. A weak dog is often set upon by the others and killed.

Driving dogs requires both skill and endurance, for the driver must run beside them, guiding them by his voice and whip. Here are the runners attached to this post. They look awkward here but on the trail they are graceful enough. These men are employed in Saskatchewan by a large fur company.

One of these men here is a member of a great fur company, but all the faces are so browned by the sun and blackened by smoke that it is difficult to decide which is white and which Indian. You can tell from the small size of the trees and the slimness of their trunks that the men are in the sub-Arctic forest.

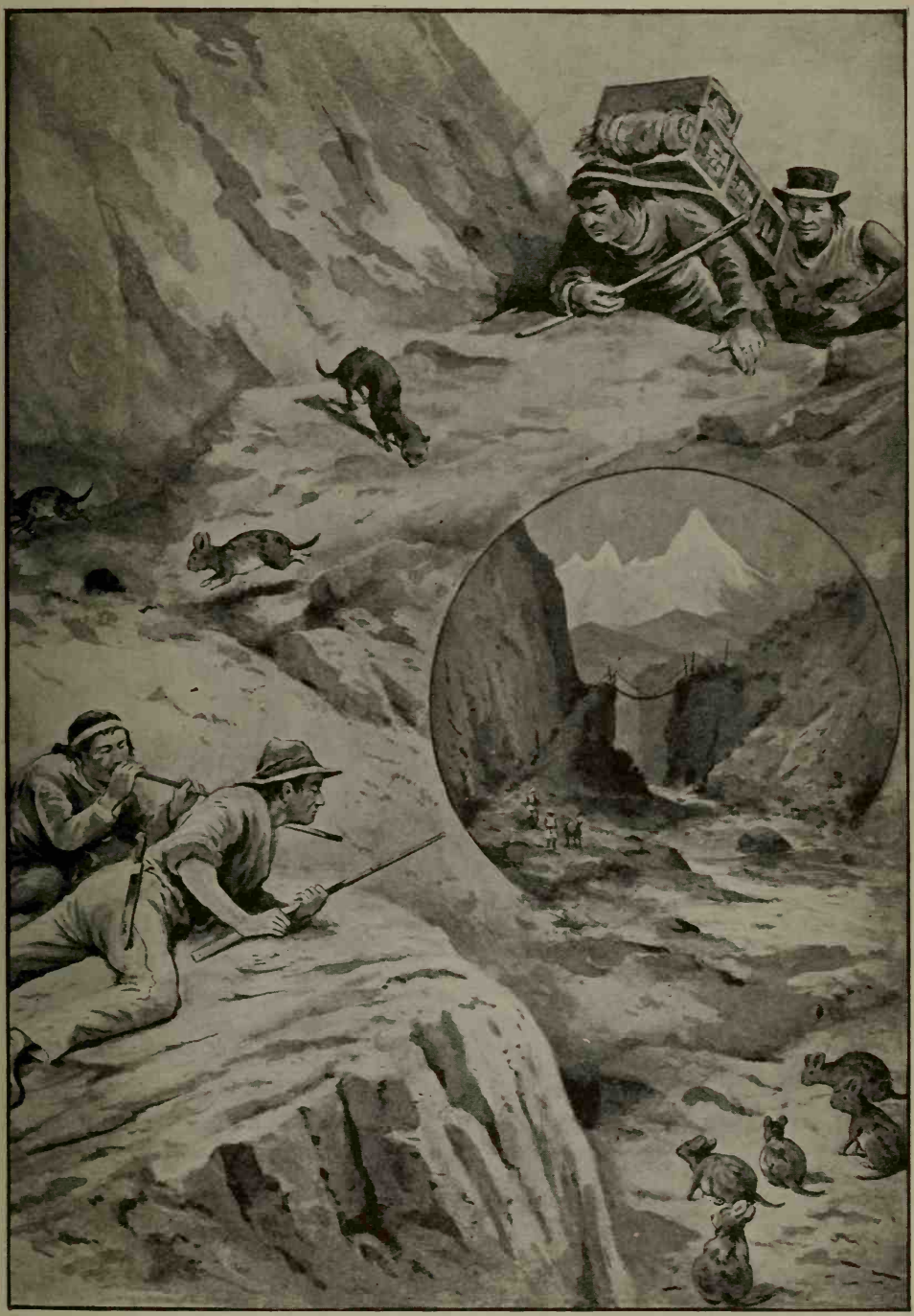
Pictures by courtesy of Revillon Freres, New York.

TRAPPING FUR ANIMALS UNDER WATER



Some fur animals make their burrows under water, like the beaver, shown in the top left-hand picture, and the musk-rat, seen below. Traps have to be set under water, and here we see how the hunters work. The beaver trap is a noose fastened to a branch, so arranged that directly the beaver's head is in the loop the branch springs up and the animal is caught. The musk-rat, which gets its name from its strong musky smell, is captured in snap-up spring traps. The beaver's fur is chestnut brown in color, and is very close and warm. It was formerly used for making tall hats, and if silk had not been thought of for this purpose, the demand for beaver would have been so great that the animal would have been extinct now.

CHINCHILLA HUNTERS IN THE MOUNTAINS



There is a little animal whose skin is much sought after for muffs and furs, which is found, not in North America, but away up in the higher mountains of the Andes of Peru, in places like that shown in our circular picture. It is called the chinchilla, and is a near relation of the guinea-pig, though it looks like a squirrel, runs like a mouse, and is the size of a rabbit. Its fur is very soft, and is a delicate grey in color, mottled with black. Great skill is needed in hunting the chinchilla so as not to damage its skin. Sometimes the natives of Peru take a ferret, and, as soon as the chinchilla appears, let the ferret loose, when it kills the animal instantly; at other times they use a tube, called a blow-gun, from which a tiny dart is blown with the mouth.

natural color. Cross fox, the pretty dark gray fox which has a dark cross on its shoulders, comes from Canada and Alaska, and kit foxes and gray foxes are American foxes too. The Arctic fox is found by the Eskimos within the Arctic Circle, and the blue fox is found chiefly in the Aleutian Islands and Alaska, though a few are found by the hunters of Kamchatka. The king of all the foxes, however, is the silver fox. This beautiful animal has a jet black coat, with long silky hairs tipped with silver white. Sometimes, however, the long hairs are black with not a touch of white or almost none to be seen, and then the skin is called "natural black fox" and is very valuable. Silver foxes are very rare, but may be found all the way across the American continent in the cold region below the Arctic Circle and south to Prince Edward Island. The silver white curly fur, called Tibet, that is so much used for baby carriage rugs, and for trimmings on coats for little children, comes from the skins of lambs with very white coats, which live in Central Asia. In Asia and Russia there are sheep farms where nothing is kept but special kinds of sheep which have a beautiful soft silky wool, which grows in close curls. These sheep give us the skins that we know as astrachan, caracul, Persian lamb and broadtail. Sometimes the lambs are killed when they are only a day or two old. In this case the fur is soft and wavy, and is called broadtail. When the lamb is allowed to live for six or seven days, the fur gets a tight curl and is called Persian lamb, and when it grows still older, it is called caracul. Some caracul sheep have been brought to the United States and Canada, and it is hoped that they will take kindly to their new homes. Gray Persian lamb comes from a gray sheep called a crimmer, which lives in the south of Russia.

ANIMALS THAT ARE KEPT IN CAPTIVITY FOR THE SAKE OF THEIR SKINS

From the sad stories of the beaver, the sea otter and the seal, we can understand the fear that has arisen that many of the most valuable of the fur-bearing animals may become extinct. As more and more of the wild lands are placed under cultivation, there are fewer and fewer places for the wild animals and life becomes very hard for them, and especially for the carnivorous animals, which give us the best fur. It has been feared that by and by only the far cold north will be left for the hunter and trapper. Laws therefore have been made to protect the wild inhabitants of the woods, and places of refuge have been provided for them in national parks and reserves. Even so, the demand for furs cannot be satisfied by the hunters and trappers, and this demand has given rise to a new industry called fur farming.

Skunks are kept in enclosures in various parts of the United States and Canada, where the winters are cold enough to make the fur grow thick and soft. The most successful farms, however, are in Pennsylvania and Ohio. The blue foxes which overrun some of the Aleutian and Pribyloff Islands are fed every winter, but these islands may be called fox preserves rather than fur farms, and the same thing may be said of the New England swamps where muskrats live.

THE ROMANCE OF SILVER FOX FARMING

In the fox farms of Prince Edward Islands and British Columbia, however, wild foxes are born and reared in captivity for the sake of their furs. The silver fox is most in demand for these farms, but red and gray foxes are also kept.

Some years ago, two young men named Dalton and Oulton, who knew a good deal about the habits of foxes, succeeded in keeping some silver foxes in fenced enclosures until the descendants of the original pair, that had been captured, became numerous enough to kill some of them off for their furs. The furs brought good prices on the London markets, and as soon as this fact became known other men decided to raise foxes too, and fox farming became an occupation on the island. The price of foxes instantly rose, until a good pair of six months old foxes sold for $18,000. Of course, at this price few people could afford to buy foxes, and companies were formed to carry on the industry and many men mortgaged their property to take shares in these companies. Naturally, when such high prices could be obtained for live animals, few foxes have been killed for the sake of their fur. It has been proved, however, that foxes, if properly cared for, will live and thrive in captivity, and it is likely that fox farming will add another prosperous industry to the world's work.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 5135.

"THOUGHT," AS EXPRESSED BY THREE FAMOUS ARTISTS

The first of these pictures is from Michael Angelo's statue of Lorenzo de Medici, the second from a painting by Sir John Millais, and the third from a statue by a great Frenchman, Auguste Rodin.

HOW TO THINK

CONTINUED FROM 5000

THE putting of things together in the mind, or association, as it is called, is the beginning of all the powers of which we are most proud; but though the usual name for it is the association of ideas, yet it does not apply only to ideas, but to everything that can enter the mind—a scent, a pain, a tone of voice, and thousands of other things that cannot be called ideas at all.

We know that there is a stage beyond seeing, and that is perceiving, and the proper name for a thing perceived is a percept, as we read on page 4995. Like everything else, except mere sensation itself, perception depends upon memory. The case of a puzzle picture, where we look for a long time and at last perceive a face, is a good instance of the difference between seeing and perceiving, and the same applies to hearing sounds and recognizing them as a tune.

But these things that we perceive and make percepts are not ideas; they are simply a certain set of sensations put together and made into a whole. Perception is a great advance upon sensation, no doubt; but there is something better still, and the proper name for that is conception, or conceiving, as when we say, "I conceive that the stars must all be suns." That was the great idea, or conception, of Giordano Bruno, and it is evidently something beyond the mere perceiving, or recognizing, that certain colors and shadows we see make a chair.

We have passed from the mere level of things looked at, or sounds heard, to the region of thinking. Here is an idea, or a *concept*—a thought. Two memories have been put together in the mind, and connected, or held together, by it in a certain way. Previously there were in the mind the memories of certain percepts; first, the stars, and secondly, the sun. But the mind performed the great act of conceiving; it associated, or put together, the two percepts, the stars and the sun, and it made a new and different thing—the thought that the stars are suns.

For thousands of years men had not only seen the stars and the sun, but had perceived them, and had carried in their minds clear memories of the stars and the sun, so that they could recognize them when they saw them again. But not until the mind of Giordano

Bruno said "The stars are suns and the sun is a star" had anyone performed this great association of ideas, to use the old name. This instance we have chosen is a great one, but we perform little associations of ideas every day, whenever we think at all. A great instance has purposely been chosen, because what we are trying to understand is the building up of the mind, and such a case as this helps us to realize the orderly stages of the mind's wonderful ascent from the mere sensation of seeing up to one of the greatest ideas in the world. Let us just observe for ourselves how the stages follow upon one another.

How a child's mind is gradually built up

John Locke said that there is nothing in the mind except what was first in the senses, and that everything which comes to be in the mind is built up out of sensations and reflections upon them. Now, this is true, even in such a tremendous idea in astronomy as that the stars are suns. This begins with mere sensation. The mind begins its existence in babyhood and childhood without any inborn ideas of any kind. Its first experiences are mere sensations. The eye, as we know, is made from a part of the brain which has come forward outside the skull—"The brain comes out to see," as has been said. The eyes are turned upwards, and certain impressions of light are gained. These are mere sensations.

If there were no such thing as memory, they might be repeated every night during a lifetime, and nothing would come of it. But living matter remembers. So, beginning with sensation and with the necessary help of memory, we pass to the stage of perception where the points of light seen one night are more than seen, for they are perceived to be the same as the points of light that have been seen on former nights.

Real thinking is putting things together in the mind

Percepts are remembered just as sensations are, and so we may go about with the percepts in our mind of the stars and the sun. Then one man singled out from the rest puts the two percepts together, and so makes a *concept* by this process of conception, or thought, and says the stars are suns. This teaches us the slow and necessary order in which the mind is built and grows, and the dependence of its highest deeds upon its humblest deeds. It is also a good instance of the truth that all thinking is association of ideas. The word conceive means "to take together"; the word associate means "to make companions"; and all thinking is putting things together—making companions of them, making a relation between them.

To some extent we all do this without effort or intention, but beyond a certain point we are very likely not to trouble about it. The point where we stop the process is the point at which our interest ends. Thinking is not a thing that happens to us, but a thing that we do, and in all doing a motive power has to come from somewhere. The motive power in this great doing of the mind, which we call thinking, is interest. Here we come to the key of one of the great differences between men, and, if the study of the association of ideas taught us nothing else, it would still be well worth while to study for this.

The secret of success in all great thinkers

We are right to admire the "kings of thought," but we are very wrong in our notions of what makes them great. It is true that in certain departments there are very special powers which one brain has and another has not; this is true of mathematics, for instance, and of music. But, apart from that, there is nothing more certain than that most of the great thoughts, and most of the great discoveries of mankind, might have been thought or made by anyone if they had been interested enough.

The secret of most of the great deeds done by the minds of men, in the way of pure thought or association of ideas, has been the great difference, not in the way in which the great minds associate, but in the fact of interest and patience leading them to go on thinking and thinking, endlessly revolving the ideas in their minds, and at last finding out the truth.

For, of course, associations of ideas may be false or true, or they may be merely fanciful, not pretending to be true, as when we say the moon is made of green cheese. But the greatest business of the human mind in its power of association is the discovery of truth, and we ought to have a right notion in our heads of what we mean by truth.

We may think of our mind as a kind of mirror in which the outside world is reflected. Outside, then, there are things, and the reflection of things in our minds ought to correspond to the things as they are. Things outside and thoughts inside ought duly to reflect each other. Very often they do not. Our image of the outside world is distorted and twisted, or there are huge gaps. But, to some extent, our thoughts, the associations of our ideas, do genuinely correspond to the associations of things in the outside world; and then we can say that our thoughts are true.

THE THINGS THAT MAKE A MAN A GREAT THINKER

Anyone can associate any ideas; there is no difficulty about that. We may say the stars are night-lights, and a fancy like that may have some good in it as a fancy; but the great object of our minds is to make our thoughts genuinely correspond to things.

The great thinker is he who not only associates ideas, but makes the associations correspond to the associations in Nature. The virtue and value of the thought that the stars are suns is that that relation between the two in our minds is the relation between them in Nature herself. The reflection of things in the mirror of our minds, so to speak, is so far perfect.

If association is an act of the mind requiring power to do it, if it is tremendously important, as it is, because right thinking goes a long way towards right doing, and if interest is the great motive which makes the mind think, then, certainly, it is our business to find out how far we can help and foster this interest in our minds, and also to find out whether one kind of interest differs greatly from another in its value for this purpose.

HOW WE MAY HELP OURSELVES TO BECOME REAL THINKERS

In the first place, it is certainly possible for us to foster interest in our own minds and in the minds of other people, and there are few more useful tasks than that of the people who go about trying to open other people's eyes, as we say, so that they shall see the interest of things and thereby start thinking about them.

There are false or doubtful kinds of interest as well as good ones. A man may be interested simply in making money, and the machinery of association in his mind will work, in consequence, with astonishing skill and rapidity; or a boy may be interested only in passing an examination, and so his machinery of association works hard for a time at something or other, and after the examination he seldom or never thinks of it again.

The blame is not his, but that of the system that makes a victim of him. Worst of all, perhaps, in its results, is the kind of interest which sets men studying things only in order to defeat someone else, or to prove that they are right, or to make a success for the party or the class or the church to which they belong against some other party or class or church. This kind of interest is extremely powerful and very general, and, according to the universal laws of the mind, it produces its due result. Unfortunately, interest of this kind and interest in money are the driving power of most of the work of association, or thinking, that is done in the world.

THE HARM OF LETTING OUR THINKING BE GUIDED BY WRONG INTERESTS

If association done under interests of this kind resulted in the discovery of truth, that would be good; but, as a rule, it does not. Interest in the success of our party or our class or our religion, or of the people who have paid us to think and argue, destroys the true working of association of thinking in two distinct ways—both are disastrous. One of them is obvious, and the other is not.

The obvious one is that it is to our interest now to make the worse appear the better reason. We do not now make all the possible associations in our minds until we find the one which seems the truest, but we simply make the associations which best suit our case, and then we try to persuade other people that they are true. Things are so complicated that most men, if they think a little—and their interest sees to it that they do—can make the worse appear the better reason, and so associations are formed which are false. This may benefit the person or the class or the country or the party, but in the long run it must injure mankind. We must believe that truth is far more worth while than falsehood, or else we had better stop thinking at all. But there is the second less obvious way, in which the false kinds of interest lead men astray. In the last case men

deliberately deceive other people, but in this case they unconsciously deceive themselves. This is because the whole process of association can be upset and changed by feeling. Long ago this was quite forgotten by men of science.

THE WAY IN WHICH OUR FEELING AFFECTS OUR THINKING

There was a time when men thought that the intelligence, or intellect—the part which knows and thinks—was practically the whole of the mind. They took no notice of feeling, and they thought that our deeds proceeded only from the results of what we thought. It is very strange how men could have thought this, for everyone knows how largely our feelings determine our deeds.

But to-day we do not make the mistake of supposing that the intellect is the whole of the mind, and so we are prepared to understand how much the intellect is affected by other parts of the mind. Thinking, or association, is a kind of doing, and we have just said that doing is largely determined by feeling. When we feel angry we are apt to kick, or hit, and so on.

Now, what is true of other more obvious kinds of doing is also true of that very wonderful, though less obvious, kind of doing which is called thinking. What we feel often decides what we think. We want to win, for money or for glory or for spite; we are fighting another country, and we want to prove that we are right; or we are fighting for our class or our church against people who dress differently, or who arrange the service differently in their places of worship. We fancy that we are seeking the truth, but we are not seeking the truth; and just for that reason we do not find it. We are driven by some interest which is not interest in truth, and that decides where we get to.

THE WRONGFULNESS OF BELIEVING ONLY WHAT WE WANT TO BELIEVE

This upsetting of the judgment by feeling, so that, as happens every day all over the world, men come to believe what they want to believe, is one of the most important facts in the life of mankind, and accounts for half the facts of human history. If we are at all sensible and watchful, we can soon notice for ourselves what happens, because it is likely to happen to every one of us; and we need not wait long for a chance of observing it. What we shall find is probably this: that somehow or other all the facts and ideas and memories which suit what we want to believe, or to prove or persuade other people of, stand out strongly in the foreground of our minds. We know that the secret of attention is interest, and these things which we want to believe interest us most and so we attend to them most.

Unfortunately, we attend to them so much that we do not attend to the other facts and ideas which do not suit our case. But we cannot form associations unless we attend, and so the associations which we do form, and the arguments which we use, are all based upon the things to which we have attended, the things that interested us most, the things that suited our case. That is the reason why we often go wrong.

THE REASONS WHY MEN DO NOT ALWAYS SEARCH FOR TRUTH

We may be arguing with someone else who is interested to prove the opposite. Just as the points which favor us press up into our minds, so the points which favor his case press up into his. But really we do not listen to his arguments, and he does not listen to ours, and neither of us convinces the other.

This is the sort of thing that happens in politics, and most of the things men quarrel about. There is a certain amount of deliberate deception, but the great key to the differences of opinion which divide even intelligent men is self-deception, depending upon the way in which our processes of association are spoiled by our feelings and our interests.

This danger comes into everything, even into the discovery of truth. There are many reasons why it enters there also. It is not the discovery of truth, but trying to persuade people that we have discovered truth, that often leads to money or glory. Quite apart from that, when a man has said a thing, he likes to prove himself right, and that, of course, is not quite the same as liking to find the truth.

Then there are motives like jealousy, or motives like trying to prove that something which is believed by our church or our class or the particular school to which we belong is right. All this only causes disaster. It means that a man, instead of looking at all the facts, looks only at some of them; it means that he

sees the importance of facts that suit his case, and cannot see the importance of those which do not suit his case, and so he goes wrong.

But everywhere, in all ages, there are a few men who are real lovers of truth. They would rather give up their beliefs than believe what they feel to be untrue; they would rather believe the truth and be despised and hated than persuade men of something that is not true and be honored.

WHY A THINKER SHOULD BE INTERESTED ONLY IN SEEKING THE TRUTH

The success which in some measure always attends these people, so that, if their brains are of a high order, they become the great thinkers of the world, like Newton or Darwin or Huxley, depends absolutely upon the quality of the interest which drives them. We must have interest in order to make us think, or associate, but we must have the right kind of interest if we are to think rightly.

We can see, if we study the work of such a man as Darwin, exactly the way in which this interest in truth, and in truth only, keeps a thinker right. He is afraid of only one thing, and that is of going wrong. If his object were to prove anything in particular, he would be more interested in one set of facts than in another, but, as it is, he is equally interested in all facts, because all facts lead equally to the truth. They do not all lead equally to his theory, perhaps, but that does not really matter—it is so much the worse for his theory, and so much the better for truth, towards which he is striving.

THE MAN WHO TRIES TO FIND FACTS, AND THE MAN WHO TRIES TO PROVE A CASE

Darwin began with a theory which came into his head, and then he spent twenty years working at it. People say that he spent twenty years trying to prove it, but that is simply not the case. If we study Darwin's mind, and the lines of the work he did, we shall agree that it is nearer the truth to say that he spent twenty years trying to disprove his theory. Indeed, he was trying to prove or disprove nothing, but simply to find the truth.

The success of the successful lawyer is, of course, entirely different. His business is to win his case. He therefore lays all the emphasis on the facts which favor it, and purposely keeps in the background the facts which do not. He gets the verdict of the jury, but that is not the method to follow if we wish to gain the verdict of no jury, not even of all mankind, but the verdict of Nature herself.

Now we must conclude our study of association by observing how association comes into the higher acts of memory, which are those of recognizing and, more especially, of recalling things. The highest kind of memory is the memory of a man like Darwin, who, when he looks at a yellow primrose, or whatever it may be, is able to recall in connection with that primrose a thousand facts of likeness and contrast which in some way or other relate the primrose to other things.

The point is not that the thousand facts are there—they might be there in anyone's mind. The point is that the primrose suggests them; the point, still more, is that, of all the facts in that man's mind, the primrose suggests just those which really do bear upon the primrose and help to make it understood. "Ah," he says, "I remember."

A WISE MAN WHO KNOWS LITTLE, AND A FOOLISH MAN WHO KNOWS MUCH

Then the man recalls some fact about some utterly different flower in some other part of the world which he has perhaps seen or has perhaps only read about; and the two facts taken together reveal a truth. The fact of the other flower may have been in another man's mind, but it did not occur to him, and there is the difference.

For all the uses of the mind, this kind of memory is the best possession in the world. It is of no use to store things in the mind if we cannot recall the right things when they are wanted. But people who have not studied the mind constantly make this mistake. A man may be a walking encyclopædia, and yet be very foolish. His mind is crammed with facts, but he cannot associate them rightly; they do not suggest each other to him in their true relations, and so they are simply useless. Another man may have only one-thousandth part of the knowledge but a thousand times more wisdom, because the facts in his mind are properly sorted and arranged and connected and classified and compared, or, in a word, the facts are associated.

THE NEXT PART OF THIS IS ON PAGE 5187.

THE ROUND-LEAVED SUNDEW

We see how the insect-eating plant is attracted to flesh by the pictures on page 3566. Wonderful powers used to be attributed to it.

THE COMMON BUTTERWORT

This is another of our insect-eating plants. The leaves, with their frosted appearance, and the violet flowers give the plant a striking appearance.

THE BLACKBERRY

The blackberry blossom discloses its family relationship by its likeness to a single rose with white crumpled petals. The flowers are scentless, but smother the tall, arching stalks with bloom.

THE BUCK BEAN

The buck bean, which is also called the bog bean and the marsh trefoil, is one of the handsomest flowers of the bog-land. Its flowers are white, tipped with pink, and as many as twelve grow on one flower-spike.

THE FLOWERS OF THE MARSHES

CONTINUED FROM 4956

TO some extent the flowers of the bog and marsh are the same as those of the streamside. This, of course, is only what one would expect when it is considered that the reason for their existence in either place is their liking for abundant moisture at the roots.

Botanists call them *hydrophytes*, or water plants; while those of the downlands are mostly *xerophytes*, or dry plants; and those of the hedgerow, field and wood are mainly *mesophytes*, or medium plants, because they like a soil that is neither wet nor dry. Therefore, when we are hunting for flowers around boggy land, we must not be surprised if we again meet with old friends of the streamside.

The soil of the bog is mainly peat, which is composed of the remains of plants that have grown on the spot. In most bogs we shall find a certain kind of moss, known as sphagnum, or bog moss, which grows in great quantities, the branches of each plant loosely interlocking with those of its neighbors, so that they become like a huge sponge, holding much water. If we pull up a handful of bog moss, and squeeze it, we shall get a clear idea of this. The bog moss grows to a great length, always fresh green at the top and dead at the bottom. The pressure of the new growths upon the old gradually turns the lower part into peat, which fills up the wet hollow where the bog began. When dried, peat makes good fuel, but just now we are more interested in the flowers that may be found in the bogs and in marshy places. The bog moss is not a flowering plant; but we may be interested in looking for its fruits, which are red and round, about the size of a small pea, standing on slender stalks above the plant.

Among the most curious of the bog plants are the sundews. As flowering plants they are not very striking, for their blossoms are small and white. In this case it is the leaves that awaken our interest and wonder. We have several kinds—as the oblong-leaved, the spatulate-leaved, and the thread-leaved sundews. The round-leaved sundew has a small root-stock, and not much in the way of roots; but little more than is needed to hold it securely in the soil.

It has other means of getting its food, as we shall see. From the root-stock all around range a dozen or more leaves on long, hairy leaf-stalks. The leaf proper is half an inch across, while the leaf-stalk frequently measures an inch and a half long. The round leaf-blade is studded all over with long crimson glands, with a knob at the tip of each. From this knob

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there is poured out a clear, sticky fluid, which can be drawn out into long threads, as though it were a very good sort of liquid gum.

This gum, as we may call it, glitters in the sunshine, and, in combination with the red color of the leaves, makes these appear more like flowers sprinkled with dewdrops. They also look not unlike small sea anemones, though it is not likely that they present such an appearance to the insects that visit them; but their action is much like that of an anemone.

Now, the sundew is so clever that it can tell the difference between things that will serve it as food and things that will not. If upon a fully open leaf we drop a particle of stone or glass, nothing will happen, which shows that the leaf has got some sense of taste or smell. But if we were to drop upon it the smallest fragment of meat, or even a snippet of hair, it will know that the substance is *animal*, and will bend its tentacles towards it, and envelop it.

THE WRINKLED FOLIAGE OF THE HAIRY BONESET

The great, grayish, hairy boneset is a striking plant of wet places. Its deeply wrinkled foliage and great flowering tops, made up of tiny, dull white flowerets in little heads, were utilized by country folk as a favorite medicine, perhaps aiding the setting of bones by keeping the patient in good health. Its other name, "thoroughwort," refers to the way in which the tall stem appears to pierce the centre of a long, double-pointed leaf,—an appearance caused by the union of the bases of a pair of exactly opposite leaves.

THE WHITE-FRINGED FLOWER OF THE BUCK BEAN, OR BOG BEAN

One of the most lovely of these little-known bog flowers is the buck bean, or bog bean. We shall know it at once if we remember its name, because its large leaves are broken up into three leaflets, and look like the leaves of the broad bean. These leaves come from a thick, creeping root-stock, from the middle of which rises a stout flower-stem bearing white or pink funnel-shaped flowers, the lobes of the corolla covered with fleshy fringes, and the stamens red. These should be sought in May or June.

THE YELLOW MARSH MARIGOLD, OR KINGCUP

If our visit to the bog is in spring, we shall find parts of it turned to gold by the rich yellow flowers of the marsh marigold. This is one of the buttercup family, as we shall soon see by the flowers. They are just huge buttercups, two inches across. There is a thick, creeping root-stock, that roots as it goes, and sends up thick stems and large, glossy, kidney-shaped leaves, that increase in size after flowering.

The flower has no petals, but the sepals are colored and enlarged, and serve as well as petals. There are many golden stamens, and nectar is poured out abundantly at the base of the pistils, and attracts beetles, flies, and bees. Another name for the marsh marigold, given to it in many districts is the kingcup.

THE LILAC-COLORED FLOWERS OF THE MARSH VIOLET

About the same time we may find the marsh violet in flower. Its leaves are broader than those of the sweet and dog violets, more kidney-shaped than heart-shaped, and the lilac-colored flowers stand high above the leaves on very erect stalks. They are not scented, and are sometimes white. The arrangements of the flower are much the same as in the case of the other violets.

THE BLACK SNAKEROOT, SOMETIMES CALLED BLACK COHOSH

The black snakeroot, or black cohosh, shoots up in dark woods, as tall as a man. Its thick, knotted, fibrous roots are used in medicine. The leaves are made up of many small leaflets, and the tall flower-stalks are slender, pointed, and studded with delicate white tufts, which one may discover to be clusters of thread-like stamens, thrust out from flowers, whose sepals and petals are so small as to be hardly noticed, or have fallen away.

THE FERN-LIKE MEADOW-RUES AND DELICATE SPIRÆA

There is a group of herbs called meadow-rues, from a similarity in the delicate, fern-like foliage, made up of small leaflets, to that of the garden-rue. They bear great branching clusters of tassel-like little flowers in which only the quivering groups of long stamens are noticeable. One kind blooms early on rocky hillsides, while another with snowy white flowers, rears them high in meadow-lands, on very wet places.

Close by one will often find the delicate American meadow-sweet, or spiræa, quite a large bush, with slender branches bent down by the pointed, open clusters

FLOWERS OF THE MARSHES

THE MARSH MARIGOLD

In boggy and marshy places the marsh marigold, with its bright yellow flowers, is a conspicuous plant. After the plant has flowered, the leaves increase.

THE MARSH VIOLET

The flowers of the unscented marsh violet, which grows principally in the North, are paler than those of the sweet violet. They are either lilac or white.

THE HAIRY BONESET

The boneset or thoroughwort was a medicinal plant of high repute with our grandmothers, who would gather its blossoms and leaves for their healing tea.

SPIRAEA AND MEADOW-RUE

The meadow-rue takes its name from its resemblance, in leaves, to the rue of our gardens. The spiraea is often found near the meadow-rue.

THE SYRINGA

This tall, hardy shrub is rather ungainly, but when in bloom redeems itself by its profusion of square blossoms, creamy-tinted, waxy, and one is odorous.

THE GRASS OF PARNASSUS

This beautiful plant is not a grass, but a member of the saxifrage family. The heart-shaped leaves grow on the end of long stalks; the flowers are white.

THE CHOKEBERRY

The chokeberry, a near relative of the meadow-sweet, is most often found on the edges of ponds and streams. Its berries are edible but dry and choking.

THE TURTLEHEAD

The lovely white flowers of this plant look like the jaws of a turtle, and hence the name; and like its namesake, the plant is to be found in wet places.

THE BIRD'S EYE PRIMROSE

Certain bogland plants are found principally in the marshy lands of the northern United States and Canada. Among them is the bird's-eye primrose with foliage besprinkled with sulphur-like meal.

THE MARSH CINQUEFOIL

The marsh cinquefoil belongs to the rose family. It is a stout plant about a foot high with large, dingy, purplish-brown flowers, and is common in European bogs. The edges of the leaves are deeply toothed.

THE MARSH PENNYWORT

This plant is also called the white-rot. Its round, smooth, shining leaves are the most conspicuous part of it, and the flowers, which are small, never rise above the leaves, and so must be searched for closely.

THE WILD ANGELICA

The flowers of the wild angelica, white tinged with pink, are a familiar sight in European swamps. The plant is tall and makes a good yellow dye. The stalks are used for salads, and sometimes candied with sugar.

of bloom at their ends. The flowerets are flesh-tinted in the bud, growing paler as they open, and are like miniature apple blossoms. The bush may easily be transplated to a damp spot in the garden, and will flourish wonderfully.

THE CHOKEBERRY IS A RELATIVE OF THE SPIRÆA

Another shrub, closely related to the spiræa, and with white, tiny, apple-like flowers, but arranged in flat clusters, is the chokeberry, that has small oval or obovate leaves, sharply saw-toothed on the edges. It grows knee or even waist high, and often stands in water. Late in summer the little bushes are loaded with red or nearly black berries, which the Indians occasionally ate, although the berries were so dry and tough that they were nearly choked.

THE QUAINT FLOWERS OF THE TURTLEHEAD

The edges of a marsh often seem to have sheets of dull white laid over them, due to crowds of the quaint turtleheads. The slender stems, bearing pairs of glossy leaves, are topped by thickly crowded, odd-shaped blossoms, quite plainly suggesting in their shape the pointed jaw of a turtle, and also resembling a snapdragon, to which they are closely allied. But instead of being black and wrinkled, or brilliantly tinted, the floral turtleheads are of the texture and bluish whiteness of china; only about the woolly mouths are the flowers faintly touched with rosy purple.

THE BRIGHT BLUE BLOSSOMS OF THE FRINGED GENTIAN

They bloom rather late, but perhaps the loveliest of all the autumnal flowers is the fringed gentian. One is not always certain to find them in the same place year after year, for they seem to change from one wet meadow to another, but they are worth hunting for, and often grow in large colonies. The whole plant is glossy with smooth, narrow leaves, and the branches stand straight up and close together, bearing dozens of the bright blue blossoms. The buds are almost square, the four petals being twisted into a cone on top, but when they open in the sunshine, the lids of the box, as it were, flare widely, edged with most exquisite fringes. They are cautious flowers, and at the touch of night's cool fingers twist up their petals again, thus protecting the delicate stamens and pistil, at the bottom of the box, against frost. The sun, next day, causes them to open again, and they will do this several times before they wither away. The fringed gentian is very closely allied to the gentians of the Alps that bloom near the everlasting snows, and also to one of the curious plants of our swamps, the closed gentian,—another glossy plant, with closed blue flowers clustered about the stem—flowers that always look like buds, as there is only a tiny aperture at the top of the tubular blossom.

THE GRASS OF PARNASSUS GROWS IN BOGS

The grass of Parnassus is another beautiful bog flower, a member of the saxifrage family. Its leaves are oval, with pointed tip and heart-shaped base. They spring in a circle from the root-stock, and stand almost erect on long stalks.

The flower-stem is much longer than the leaves, and bears one flower at its summit. This is about an inch across, the five white petals being of rather thick substance and finely streaked with green. The large pistil is in the centre of the flower, and around it are five stamens.

It is thought that there should be ten of these, and that the other five have been changed into oval scales which bear honey-glands near the pistil. From their edges grows a fringe of white hairs with yellow knobs, which shine as though they were wet.

LADIES' TRESSES MAY BE FOUND NEAR CRANBERRIES

A swamp, especially a mossy cranberry bog, is just the place to look for many American orchids, but the ladies' tresses are generally content with damp meadows, or even dry pastures. There is one common variety, however, known without much reason as the nodding ladies' tresses, which is found in very wet soil, in marshes, or even in running water. A form of it, blooming in October, is very tall and strong scented, and has cream-colored buds. Its flowers have a frosted appearance and are so arranged that the spike of flowers looks square in outline.

THE BIRD'S-EYE PRIMROSE

In the peat bogs of Europe and Canada there is a pretty little primrose called the bird's-eye primrose, or mealy primrose, because its leaves are covered on the under sides with a white or pale yellow powder.

THE BOG MYRTLE

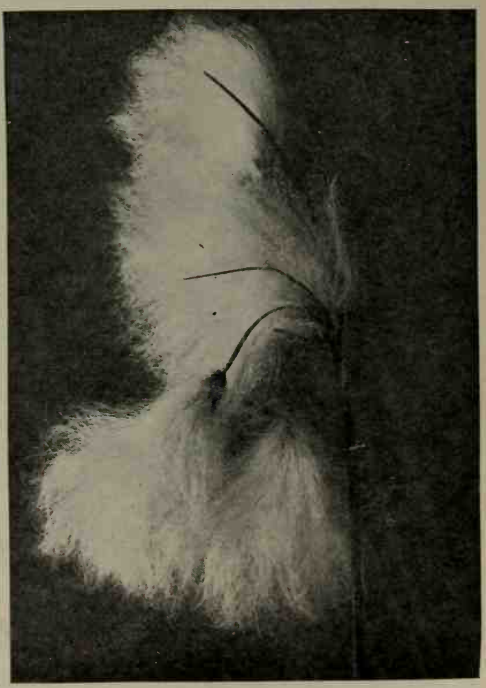
The sweet gale, or bog myrtle, is a bushy plant that flowers before it is in leaf. The bitter leaves were once used in place of hops. The leaves scent clothes.

THE GARDEN IRIS

Although many species of irises, like the common ones of our swamps, delight in marshland, those of the garden, like this, prefer sandy soil.

THE LADIES' TRESSES

This exquisite spire of blossoms, that seem braided together, holds its head above the green grass of meadows in late summer, and is almost the loveliest of American orchids. Its flowers appear frosted.



THE COMMON COTTON GRASS

In the boggy districts of the North, we often see what appears to be tufts of white cotton covering the ground. This is the cotton grass. Attempts made to spin it have failed, but it is used for stuffing pillows.

The whole plant looks much more like the garden auricula than the common primrose of the woods, for its lilac or pale purple flowers are clustered, like those of the cowslip, at the top of a short stalk, a few inches above the unwrinkled leaves. It flowers in June and July, and gets its name of bird's-eye from a patch of yellow which is found around the mouth of the corolla-tube.

THE PURPLE-BROWN MARSH CINQUEFOIL

A purple-flowered relation of the common silverweed and barren strawberry grows in bogs throughout the country, and is known as the marsh cinquefoil. It has a long woody root, like the yellow-flowered cinquefoil of the meadow, and, like it also, has its leaves divided into five or seven leaflets.

But the marsh cinquefoil has its flowers of a very dark purple-brown color—not only its petals, but the larger sepals. Some bracts below the sepals, and the tall flower-stems, are all of the same purple-brown color, which makes the plant look very singular. It flowers in the months of June and July.

THE DARK GREEN LEAVES OF THE MARSH PENNYWORT

On the bog moss we shall find a number of round, dark green leaves from half an inch to two inches across, but with no stalk visible. If we pull one up, we shall see the reason for this. The stalk is there, but fixed in the middle of the leaf underneath. The plant is called the marsh pennywort.

There is a slender stem which creeps through the moss, and, as it is hidden from the light, it is white. In the summer-time we may find its tiny cluster of pinkish-green flowers. It is one of the umbel-bearing family, but it does not look as though it were related in the least degree to the cow-parsnip.

THE PIPE-LIKE STEM OF THE ANGELICA

Another umbel-bearer that we may find on the borders of the bog, as well as in damp places in woods, is the wild angelica, which we shall have no trouble at all in placing in its proper family.

It grows to a height of five or six feet, with a thick, jointed pipe-like stem, often of a purple tint. Its large, wedge-shaped leaves are often a couple of feet in length, much divided, as are the leaves of most plants of this family. The umbels of white or purplish flowers are very large, and appear in July.

THE RED BERRIES OF THE CRANBERRY

In some parts of the country we shall find the cranberry, a relation of the bilberry and cowberry. The evergreen leaves and the flowers are very similar, but the stems creep, the flowers are red in color, and the berries are dark red and extremely acid to the taste. We may read more about these plants in another place.

THE FRAGRANT SWAMP MILKWEED KNOWN BY ITS MILKY FLUID

There are a number of Milkweeds, plants so called, as one can readily see, from the milk-white and very sticky juice that runs out of the leaves and stalks when bruised. They have small flowers, each of which is very unusual and curious in its appearance, gathered in umbels, as the clusters are called when the stalks all start from one spot, just as the ribs of an umbrella all spring from a tiny circle. Some of the umbels droop like great tassels, while others are stiffer and more upright. The swamp milkweed bears umbels of this latter kind, and is one of the prettiest of all. Its flowers are rose-pink and fragrant, and often float down the mountain streams when they fall. In its tough stems is a grayish fibre so strong, that its use like hemp, for ropes, etc., has been suggested.

THE GORGEOUS FLOWERS OF THE SALT MARSHES

In late summer, marshes, especially salt marshes, glow with countless yellow composites such as sunflowers and beggar-ticks, often woven together by strands of the climbing boneset, burdened by bunches of pale pink flowers, or by the viciously-armed "tear-thumb." Deeper in the marsh are white-flowered arrowheads with their quaint, triangular, long-tailed leaves, the blazing velvety spikes of cardinal-flowers and the flaunting swamp-rose-mallow, whose great, bell-shaped flowers, rose-colored and stained within with a deeper tint, show their near relationship to the hollyhock. There too is the rich deep purple ironweed, and the duller tone of the sticky, ill-scented camphor-weed, all glowing against a background of green cattails. They bear cylindrical fruits of brown velvet, and the globular nests of the marsh wrens.

THE NEXT NATURE STORY IS ON PAGE 5211.

THE REFORMATION MARTYRS

IT is a happy time for the world that men have at last come to see that it is wise and just to suffer every one to worship God in such fashion as his conscience bids him, and to say what he truly believes without fear, whether it be the thing that other people believe to be true or not. For we cannot force anyone to think that true which he is sure is untrue, though we may frighten him into saying he thinks so. But in the old times, especially in the time of the Reformation, of which we read in these pages, people thought they could force other folk to think what they were told, as well as to do and say what they were told; and many times in history there have been great persecutions when people would not be persuaded to deny what they really believed, or to worship false gods, or to worship the true God in a way which seemed to them to be wrong.

GIVING UP THEIR LIVES

MEN AND WOMEN WHO DIED FOR WHAT THEY BELIEVED

CONTINUED FROM 4974

IN our own country there has been less persecution for religion than almost anywhere else; but still people have been put to death for professing a forbidden religion. In Europe there has been much bloody persecution. At the time of the Reformation, when England and Scotland were becoming Protestant countries, there was a long roll of martyrs who died for their faith; some because they would not deny the old belief, but many also because they would not deny the new belief which they had learned.

Now, of these martyrs, there were some who were put to death not because they were heretics who made division in the Church, but because King Henry VIII. or Queen Elizabeth said they were traitors, who sought to set the power of the pope above the power of the king; and these were not burned at the stake, but were executed for treason. Yet the Roman Catholics who died in this way were none the less martyrs, slain for their faith's sake, of whom some deserve to be held all the more in honor because they had never sought to harm the king or the queen, but only held fast to what they believed to be the truth.

Of these the most famous are Sir Thomas More and Bishop Fisher, and, in after days, Edmund Campion. The first two were cast into prison because, when ordered by King Henry VIII. to take an oath that the king was the head of the Church, they would not obey, though they knew that for refusing they must die. But Campion went to England in the time of Queen Elizabeth, when it was forbidden to teach the Roman Catholic doctrines, and strove to win back the people of England to the old faith. Others who were joined with him were seeking the overthrow of Elizabeth herself, and, though Campion was innocent of that, he was put to torture that he might confess and show who was in this plot. But he cared only to declare his loyalty to his own faith, and would speak nothing against any man. And so for his faith's sake he perished.

Of those who died at the stake by fire for their belief in the reformed religion, called Protestantism, without any charge of aught else but of holding or teaching doctrines forbidden by the Church, there were many; and some of them even in the reign of Henry VIII., who defied the pope and set his authority at naught. For in all, save in obedience to the pope, Henry avowed himself a true believer in the doctrines of the Roman Catholics; and so, though he beheaded Fisher and More, and slew many more Catholics for what he called treason, he would have men and women burned if they preached forbidden doctrines. Of these, two above all others must be held in honor. One was a learned and pious

scholar, named John Frith, who would not deny the reformed doctrines, but was put to death chiefly because he declared that it was wrong to slay any man for his belief; so that he was the first martyr who died for claiming that every man ought to be permitted to obey his conscience.

A BRAVE WOMAN WHOSE FAITH COULD NOT BE SHAKEN BY SUFFERING

The second was a lady named Anne Askew, who was zealous in spreading the new teaching; and though she suffered such terrible torture that the Lieutenant of the Tower stayed his hand and would inflict no more on her, yet she would not recant; nor would she do so even when she was brought to the stake and promised a pardon.

But her death seemed so cruel a thing that no others were tortured for many years afterwards.

In Scotland, the first Protestant martyr was Patrick Hamilton, who was burned at the stake, and, after the fire had been long alight, held forth his arms into the flames to show that his courage was unabated. Following on, the most famous of these sufferers was George Wishart, the teacher of John Knox, after whom no others were burned in Scotland.

But nine years after Anne Askew's death, when Queen Mary was on the English throne, and all men were bidden to return to the Roman Catholic faith, there was a great persecution, so that in four years there were nearly three hundred persons who died martyrs for the Protestant faith; yet all of them might have won pardon by recanting before the judges and professing that they had erred in their belief.

Among those who died by fire in the first year were priests notable for their learning and good works. With them were four bishops, and, soon after, the Archbishop of Canterbury himself; and then no more persons of high estate were executed, only those of humble station.

HOW THE SUN BROKE THROUGH THE SKY AND SHONE UPON THE DYING MARTYR

There is a beautiful story about one of these last, a youth named William Hunter, who, when he was bound to the stake, besought those who were standing by to pray for him. One of them made the cruel answer that he would pray for him no more than for a dog. "Then," said he, seeing that by man he was refused even this kindness, "Son of God, shine upon me!" And straightway the sun broke through a great cloud that was overhead, and so bright a light fell upon him as he looked up to heaven that he could not but turn his face aside. And those who looked on thought that God had answered his prayer.

There was another lad, whose name is forgotten, to whom the judge said in pity: "Think before you answer. Can you bear to suffer the fire? Recant, and you will be free and safe." But for answer the lad thrust his hand into the flame of a candle, and so held it.

Some there were who met their cruel doom with glad triumph. Such a one was Rogers, a famous preacher, who had helped in translating the Bible into English, who, when the fierce flames leaped about him, bathed his hands in them as though they had been cold water.

And another was Rowland Taylor, the beloved Vicar of Hadleigh, who, having been condemned in London, was carried back to his own parish to die. Then, his wife and daughters coming to meet him on the way on a dark winter morning, he spoke words of comfort, bidding his wife be of good cheer, for God would be a father to his children.

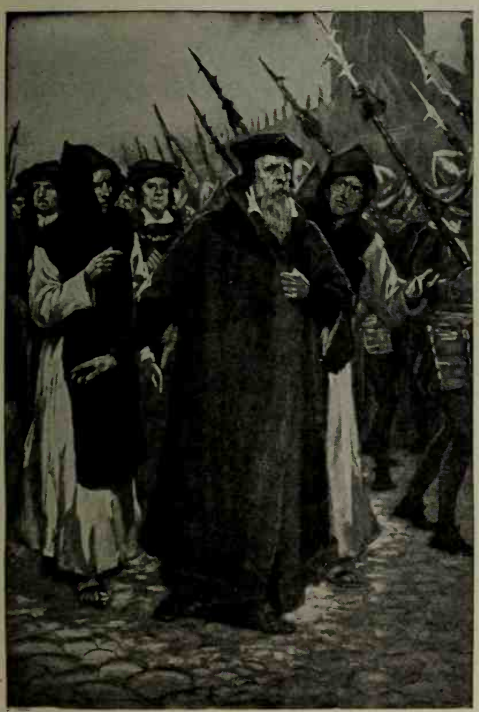
THE FOUR BISHOPS WHO WERE BURNED BY QUEEN MARY

The four bishops who suffered martyrdom were Robert Ferrar, John Hooper, Nicholas Ridley, and Hugh Latimer. Of these, Ferrar was one who had made no great stir, but, being made a bishop in the Protestant reign of Edward VI., was disliked for seeking to reform evil habits among his people; and being already in prison, having sundry foolish charges made against him, when Mary came to the throne he was not let go, but was charged with heresy, and so died a martyr.

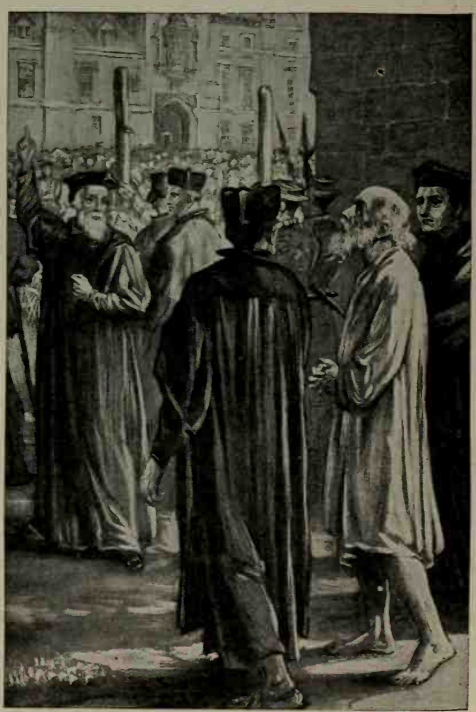
Hooper and Ridley were both very zealous reformers, but Ridley was the man whose learning and wisdom won the trust of Archbishop Cranmer, and it may be that he, more than any other, gave to the laws of the English Church the shape which they have to-day. But Hugh Latimer had already become a famous preacher when Ridley was but a young man, and had found favor with King Henry because he spoke so freely and frankly. When some would have charged him with heresy, Henry set

THREE MARTYRS OF THE REFORMATION

Sir Thomas More, who succeeded Cardinal Wolsey as Lord Chancelor of England, was one of the noble army of martyrs during the Reformation period. He could not recognize Henry VIII. as head of the English Church, and for this he was sent to the scaffold. Here he is consoling his daughter after his condemnation.



Archbishop Cranmer signed a statement that his Protestant faith was all error, but afterward repented, and went to death boldly. The hand that signed the document he held out to be burned first.



Bishop Ridley, who is here going to the stake, was one of the most learned of the Protestant martyrs. As a bishop he had been very tolerant, but he was condemned and burned with Latimer at Oxford.

them at naught and made Latimer a bishop, and a right good one. Ridley and Latimer and Archbishop Cranmer were very great friends, and when Mary laid hold on them they were all cast into prison together, and there they often held council with one another.

But afterwards these two were parted from Cranmer, and they were doomed to die at Oxford. When they were taken out to be burned, Ridley showed a stout courage; and old Latimer spoke words that have rung through the ages, saying: "Be of good comfort, Master Ridley, and play the man: we shall this day light such a candle, by God's grace, in England, as I trust shall never be put out."

The story of Cranmer is the saddest, and yet the most glorious of all. For he was by nature a timid man, yet one who had been forced into his high estate by King Henry. And in Henry's reign he had sought always to persuade the king to suffer Luther's doctrines to be taught, and had won from him leave to set up the Bible in English in all churches; and after that, in Edward's reign, it was he who, with the aid of Ridley and others, prepared the Book of Common Prayer which is used in the services of the Church of England. The older he grew, the more he became assured that the new doctrines were right, and because he was archbishop, and head of all the clergy in England, Queen Mary was the more anxious that he should publicly recant his heresy.

To this end he was parted from Ridley and Latimer, who helped to strengthen him, and was caused to look from the window of his prison when they were being martyred. Then there came upon him great fear and doubting, when he had none to lean upon, and at last he was persuaded to write that he had erred from the beginning, and that what he had taught for truth had been falsehood. Yet his courage came back to him at the last hour, and he proclaimed that he did not repent what he had taught, but he regretted that he had written anything with his pen contrary to the belief which he had thought in his heart. And so, when he came to the fire, he held forth in the flame the right hand which had offended in penning those words, so that it was first consumed, and he never flinched till the life was gone from his body. And because of his fall men account him the least among the martyrs for the faith, yet it may be that he was the greatest of them all.

HUGH LATIMER, THE ELOQUENT BISHOP AND MARTYR, PREACHING AT ST. PAUL'S CROSS

THE NEXT GOLDEN DEEDS ARE ON PAGE 5225.

FAMOUS MAKERS OF ROME

CONTINUED FROM 4045

IN all the world there is no other place so wonderful and yet so sad as Rome. It is wonderful beyond all other cities because of the relics of past power and grandeur which it preserves. The sight of its ruined splendor makes us think of that story of ancient Babylon, the mighty city of which the Bible tells us so much, and which was the greatest in the world when Rome was not yet built.

But Babylon perished, and for thousands of years lay buried under the sand and soil swept over it by the winds. We read about Babylon in that part of this book that begins on page 4957.

Rome has not fallen into decay like Babylon, for it is still a populous city. Its population is, however, only about a third of the population of the Rome of two thousand years ago, and the people who now live in Rome do not add to the glory or interest of the city. They depend for their living very largely upon people who visit Rome from other countries. Most of them are poor, not over-clean, and not well educated, although, of course, there are numbers who are both cultured and wealthy. Somehow we cannot but feel that these people ought not to be there. We want to picture Rome as peopled with the great men and women of olden times who made it the most famous city in the whole world, the home of the people who ruled over all the earth that was known in their day. It makes us sad to see old-time palaces used as rag-shops and stables, shops and offices and apartments, and so forth.

Wonderful as she still is, Rome lives, and must live, upon her past —a past such as no other city possesses. We see on the pages beginning at 435 and 535 how Rome came to be the greatest power in the world. We learn there, also, that the power of the emperors declined, and that the great city where Christians had suffered dreadful tortures, became the capital of Christianity.

But, under its weak rulers, the strength of the Roman Empire became less. In its weakness it was attacked by strong and barbarous people, and, as we have learned in the stories of other nations, it was broken up into pagan kingdoms. Meantime, the power of the Church increased. In the days of warfare, the popes alone were not afraid to stand between the weak and their oppressors, and in times

of turmoil, they were resolute in upholding the law. By and by, the pagan conquerors learned to believe in the Christian faith, and, as they received it from Rome, they naturally looked to Rome for spiritual guidance. After a time, the popes ceased to be merely heads of the Church. Not only did they become rulers of Rome, but they helped to settle the affairs of most of the nations which professed Christianity. The pope was recognized as head of the Church throughout all Western Europe, and this made him the most powerful of all the Christian rulers.

THE MAGNIFICENCE OF ROME UNDER HER OLD PAGAN RULERS

Rome reached her greatest grandeur under pagan rulers. They had temples and theatres and circuses such as the world has never seen since; they had huge and wonderful temples to all their gods and goddesses; they had lordly palaces and villas to dwell in; they had places of entertainment in which 250,000 people—more than the population of a modern city like Louisville—could be seated to witness the chariot races. Their noblest statuary was erected by the sculptors of antiquity, to glorify conquerors or to celebrate the gods whom the people worshipped. Never was there so splendid a city, before or since, as Rome in the height of her power under the pagan emperors and consuls.

Much of the splendor of old Rome still remains, for her barbarian conquerors could not overthrow and carry away all the vast monuments to bygone greatness; and it is these relics of those wonderful ages which make Rome to-day such a sad, yet fascinating, spectacle.

THE ARTISTIC GLORIES OF ROME THAT ARE UNMATCHED IN THE WHOLE WORLD

But for the beauty lavished upon her in Christian days we must go into the churches, into the galleries, and into the Vatican. There we can see wonders of art that are unmatched in the whole world. It would be hopeless to attempt anything more than a sketch of a few of the men who have made the beauties of Christian Rome. Books upon books have been written on the subject, and many more might be written without wearing out the theme.

It will serve as an introduction for us merely to glance at some of these men whom the re-awakening of art in Europe gave to Rome for her adorning. How to give each man his due is the difficulty. The vast Vatican palace, one of the chief glories of later Rome, took hundreds of years to build. If we could tell its story, and the story of the men who worked to bring it to completion, we should tell the history of the politics and art of Europe during all that time.

It stands near where the ancient Romans used to gather to worship an old oak, where, later, the dreadful Caligula built a huge circus; and hereabouts this cruel monster delighted himself at night by walking forth and slaughtering distinguished people—senators and Roman ladies whom he met on his way.

THE POPE WHO DREAMED OF THE GREATEST PALACE IN THE WORLD

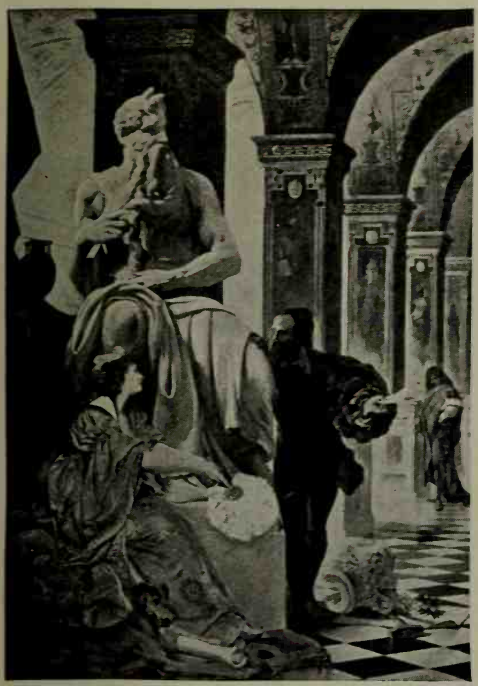
Here, too, Nero afterwards had *his* circus, in which he nailed Christians to crosses, disguised some as wild beasts and had them worried to death by dogs, and covered others with pitch and set fire to them, so that they might make living torches to light up his night's amusement in the circus.

These days passed, and the Vatican became the residence of the popes towards the end of the fifth century, though during the whole of the Middle Ages the papal residence was at the Lateran. About the year 1200 Innocent III. began to rebuild the Vatican as the settled home of the popes. He was the powerful pope who tried to take England away from bad King John, and made the latter own himself the servant of the pope.

The work at the Vatican went on from pope's reign to pope's reign, until the ambitious thought entered the mind of Nicholas V. to make the Vatican the greatest and most magnificent palace in the world. He did not live to see his scheme completed, but his successors carried it on. To-day the Vatican *is* the greatest and most splendid palace in the world, and contains the richest treasures of art and literature ever gathered together in one centre. It covers an area of 13½ acres, of which about six are occupied by the 20 courts, 200 staircases, and about 1,000 chapels, rooms, and galleries that go to make up this great building.

The popes who built the Vatican will always be remembered as among the

FOUR ARTISTS WHO MADE ROME BEAUTIFUL



Michael Angelo was greatly influenced by a pious lady named Vittoria Colonna. She was the chief inspirer of his poetry and pictures. Her death, in 1547, left the artist broken in health and spirits. Here we see the lady and the artist beside his great statue of Moses.

In this picture the artist Raphael, of whom it has been said that he would have been a great painter even if he had come into the world without hands, is talking to La Fornarina, a lady with whom he fell in love, and to whom he wrote some beautiful sonnets.

Benvenuto Cellini was the greatest of the Italian metal-workers of the golden age of art. He was an extraordinary combination of artist, soldier, braggart, and author, but his artistic workmanship in gold and silver has never been surpassed. He is shown presenting some of his work to Pope Clement VII.

Like so many Italian artists, Salvator Rosa was also a poet, but his verses often made fun of great people, and their anger drove him from Florence for a time. Although he was full of mirth, his landscapes are gloomy, and portray wild and savage scenes. Here he is showing a painting to one of his patrons.

men who helped to make Rome beautiful, and we may here note the names of some of them. First there was the powerful Innocent III., who began the rebuilding; followed by Nicholas III., who began the scheme of enlargement. John XXIII. added to the security of the palace by connecting it by a passage with the fortress of St. Angelo.

Nicholas V., the pope with the master-builder's mind, planned the scheme for making the Vatican what it has since become—the home of the pope and the cardinals, the offices of the Church, the meeting-place of all her pilgrims, the starting-place of all her missioners. The work which began under this pope was carried on by Alexander VI. Paul II. made further extensions, and then Sixtus IV. built the world-famous Sistine Chapel, so called after his name.

THE CHURCH OF ST. PETER THAT COST MORE THAN FIFTY MILLION DOLLARS

It is necessary now to turn to the building of the huge church of St. Peter, Rome's greatest sanctuary, the church dearest to Roman Catholics, as the Vatican is the palace most revered by them. The building of the church was begun in 1506 by Julius II., and counting the time which it took to build the beautiful colonnade, extended over 176 years. The cost of the main building alone was fifty million dollars. So hard was the struggle to get money that two of the popes were driven to methods which roused the indignation of many men in Germany, and led to the Reformation.

St. Peter's at Rome, built to be the greatest church of the Christian world, led to the first great division in Christendom, and brought into being the Protestant Church. Now that it is finished, St. Peter's is a building unmatched in splendor for its marbles and statuary and paintings, and for the richness of its decoration in jewels and precious metals. We see something of the magnificence of this wonderful sanctuary from the pictures in other volumes.

But Rome, as a city, suffered by the building of this mighty cathedral. Nearly all the marble with which the interior is decked was taken, not from modern quarries, but from ancient buildings many of which were leveled to the ground for the sake of only one or two pieces. However, be its history what it may, Rome has the richest and most remarkable church in history, the church which cost most and took longest to build. It also costs more to maintain than any other church.

THE GREAT TREASURES DESTROYED TO MAKE ROOM FOR ST. PETER'S

The present cathedral occupies the place of an earlier one. It is believed that it is built over the spot in Nero's circus where the apostle St. Peter was put to death. The older church was rich in works of art, which had taken long to gather together, but when the first building perished these were destroyed, either deliberately or through carelessness, when Pope Julius II. directed its destruction.

Now we may turn to the story of some of the artists who have worked for the glorification of the city. Needless to say, the great men of whom we read in our stories of the Makers of Florence and Venice, beginning on pages 2787 and 1167, found their influence extended to Rome. Fra Angelico—about whom we read on page 4035—made the world grateful to him, not alone for the sermons which he preached with his brush; he inspired men with his own ardor and made them great painters too.

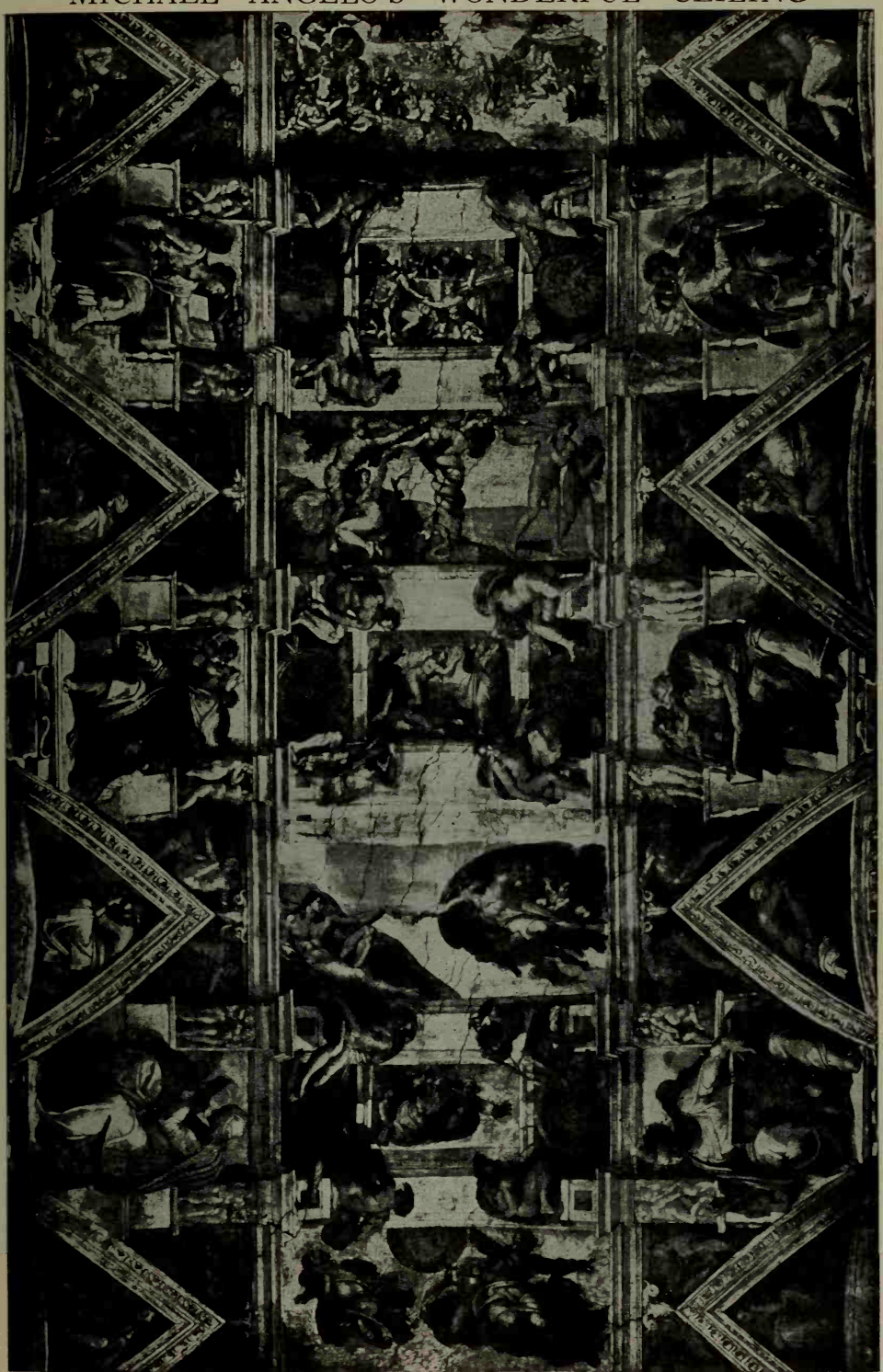
FABRIANO, THE HAPPY ARTIST WHOSE PICTURES ARE FULL OF JOY

One of these was the warm-hearted Gentile da Fabriano—of whom we read on page 1174—who was born about the middle of the fourteenth century, at Fabriano, the town from which he took his name. He was much older than the painter-friar. Nevertheless, it was from this holy man that Fabriano learned, though he may first have studied under Allegretto de Nuzio.

Some of his finest work was done for Florence and for Venice, and the latter city gave him a pension and a title of nobility. Fabriano was well advanced in years when his fame reached Rome, and caused Pope Martin V. to summon him thither to help in adorning the fine church of St. John Lateran. His pictures express the joyfulness of spirit by which he was always animated. He had something of the happy childish spirit which lives in the delightful pictures of the saintly Fra Angelico.

Among the famous artists of Florence of the early fifteenth century was Fra Filippo Lippi, who was born about 1406

MICHAEL ANGELO'S WONDERFUL CEILING



The magnificent ceiling of the Sistine Chapel, painted by Michael Angelo, is one of the great glories of Rome. This picture gives some idea of the grandeur of the decoration, which cannot be really suggested on paper.

and lived nearly all his life in Florence. His son, Filippino Lippi, who was born about 1458 and died in 1504, was only a child when his father died, but the genius of the father descended upon the son, and the fame of the Lippi family was carried by Fillippino to Rome, where to this day some of the glories of his art are to be found in the frescoes which he painted in the Minerva church to illustrate scenes in the life of St. Thomas Aquinas.

THE MASTERPIECE OF BOTTICELLI THAT WAS HIDDEN AWAY

But a greater artist than Filippino studied in the school of Fra Lippi. This was Sandro Botticelli, born at Florence about 1446. He was to have been a goldsmith, and the old story says that he was apprenticed to one named Botticelli, and took that name, for his own surname was Filipepi. Happily, he was passed on to Lippi, and then he caught the spirit of his master, and improved upon it. In his youth he loved the myths and legends of classical stories, and painted his ideas of them upon immortal canvases. Such was his "Birth of Venus" and "Venus with the Graces." But religious art presently called him, and two of his devotional pictures are among the greatest artistic glories of Florence to-day.

The manner in which he painted did not always please the critics, for one of his pictures was declared to be heretical, and had to be hidden away. Nevertheless, he was called to Rome to help in decorating the Sistine Chapel in the Vatican, where he painted three portraits, and three great frescoes which are thought by critics to be the best work that he ever did. When his work in Rome was done, he went back to Florence, and lived there for the rest of his life. During the following years he did much good work, and found time to illustrate Dante's great poem with engravings of exceeding beauty. It is said that towards the end of his life he lost much of his wealth, and that he was stricken with lameness and blindness, and was quite unable to follow the art that he loved so much.

We now approach the company of giants, a period of marvelous artists, sculptors, and painters. First let us take Donato Bramante, who was born near Urbino in 1444, and died at Rome in 1514. He went to school in Milan, where he studied geometry and perspective, sciences which in those days were not at all well understood by even the great artists. Bramante, therefore, is of much importance to us in history for the pains that he took to spread the study of these sciences, for by so doing, as we can all easily understand, he introduced greater exactness and truth into his work.

BRAMANTE, WHO LAID THE FOUNDATIONS OF ST. PETER'S

Bramante was one of the best painters of his day, but he laid aside his brush for the pencil and compasses of the architect. He was invited to Rome by Pope Alexander VI., and worked on under Julius II. It was he who first built the great galleries for the Vatican, and designed St. Peter's and laid its foundations. He meant to make the cathedral in the form of a Greek cross with a noble dome to it, but the work had been only eight years in progress when he died.

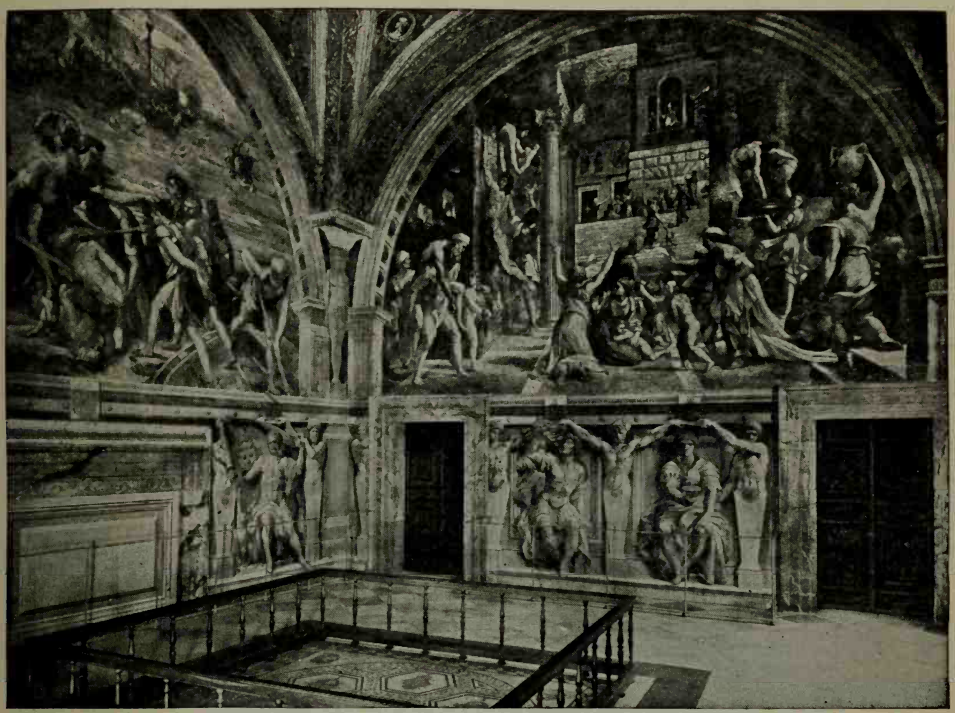
At this time three of the greatest geniuses of the world were reaching the height of their glory. One was Leonardo da Vinci, who had but little to do with Rome; but he was one of the three greatest figures there for a short time of his life. The story of his work is told on page 761, and we also read about him on page 4590, so that now we need only remember that he was one of the most fertile geniuses that ever lived.

MICHAEL ANGELO, THE GREATEST ARTIST IN AN AGE OF GREAT ARTISTS

A younger man than Leonardo was Michael Angelo—of whom we read on page 4173—younger by twenty-three years, but who was eight years older than Raphael. With these three men for rivals, we may rightly say that this was an age of giants. Michael Angelo and Leonardo were rivals for a work at Florence, resulting in each producing a world's masterpiece; and they were rivals again at Rome.

It is strange that the same age should produce two such men as Leonardo and Michael Angelo, for in many respects they were alike. They towered above nearly all their fellows in several of the arts. Michael Angelo was one of the finest sculptors that ever lived; he was one of the greatest painters; yet he was also so eminent a poet that his verses placed him in the very forefront of poets of a particular type.

THE FAMOUS WALLS OF THE POPE'S PALACE



This is one of the most beautiful rooms in the Vatican. It is one of four magnificent apartments called the Halls of Raphael, because that artist painted the walls. The picture shows the burning of Rome in 847.

The Sistine Chapel is the grandest apartment in the Vatican. The magnificent ceiling by Michael Angelo and the wonderful wall-paintings overwhelm the spectator by their beauty. When Pope Paul VI. complained about Michael Angelo's great fresco of the Last Judgment, that faces us in this picture, the artist replied: "Tell his Holiness to trouble less about the amendment of pictures and more about the reformation of men."

WHEN OLD MICHAEL ANGELO LOOKED BACK UPON HIS WORK AS A BOY

Angelo was born at Caprese, Italy, March 6, 1475, and died at Rome, February 18, 1564. His father, a man of good family, thought it degrading for his son to follow the profession of a painter; but the boy's whole affections were given to art, so he was apprenticed to a painter, when he so soon became expert that at fourteen he was able to correct the work of his master. Long, long afterwards, when Angelo was an old man, they showed him some of the paintings which he had done when a little boy. "Ah," he said, "I was a better artist then than I am now."

His life, though so distinguished, was full of vexations. While he was yet young, a jealous fellow-apprentice, in a quarrel, picked up a mallet and struck Angelo with such force as to crush his nose, and disfigure him for life. By the time that he was thirty-five the fame of Angelo had spread throughout Italy, and he was called to Rome to undertake the gigantic tomb, or mausoleum, in which the then reigning pope, Julius II., intended to be buried. This work engaged Angelo on and off for practically the remainder of his life.

He had been only two years on the work when the pope bade him undertake the decoration of the ceiling of the Sistine Chapel. Here was a task for one man! The ceiling is vaulted, 150 feet long and 50 feet broad. The work was interrupted for a time, and when he really commenced it in 1508, he found that the assistants whom he had engaged could not grasp the greatness of his ideas. Therefore Angelo undertook the painting alone, and, unaided, he carried out the work in little more than four years. No single work in modern art can compare with this.

A CEILING WHICH IS ONE OF THE WONDERS OF THE WORLD

Some of the figures on the ceiling are grand and terrible, others are exquisitely soft and beautiful, and the whole is full of deep feeling, like some great poem in figure and action. This tremendous work has been the wonder of the artistic world ever since it was finished.

While he was at work on it, Angelo gave every thought to it. He would have no help, he would have no onlookers. The chapel was closed, and he hated to see even the pope himself there. It is said that one day the pope did creep in on tiptoe to see how the work was progressing. The painter saw him, and angrily let fall some tools with a crash near where the pope was standing. The pope fled, but was so angry that Angelo had to leave Rome until the storm blew over.

It may have been about this time, though probably it was some years earlier in his life, that Angelo carved one of his famous statues for Florence. For years and years there had stood in a backyard in Florence a great misshapen block of marble which another sculptor, long before, had spoiled in trying to shape from it the figure of a giant. Angelo was asked if he could carve a figure from it. He said that he could, and the magic of his chisel won from the huge block the great statue of David, with which the world is now familiar. The wonderful statue of Moses which we see on page 5099 belongs to the tomb of Pope Julius II.

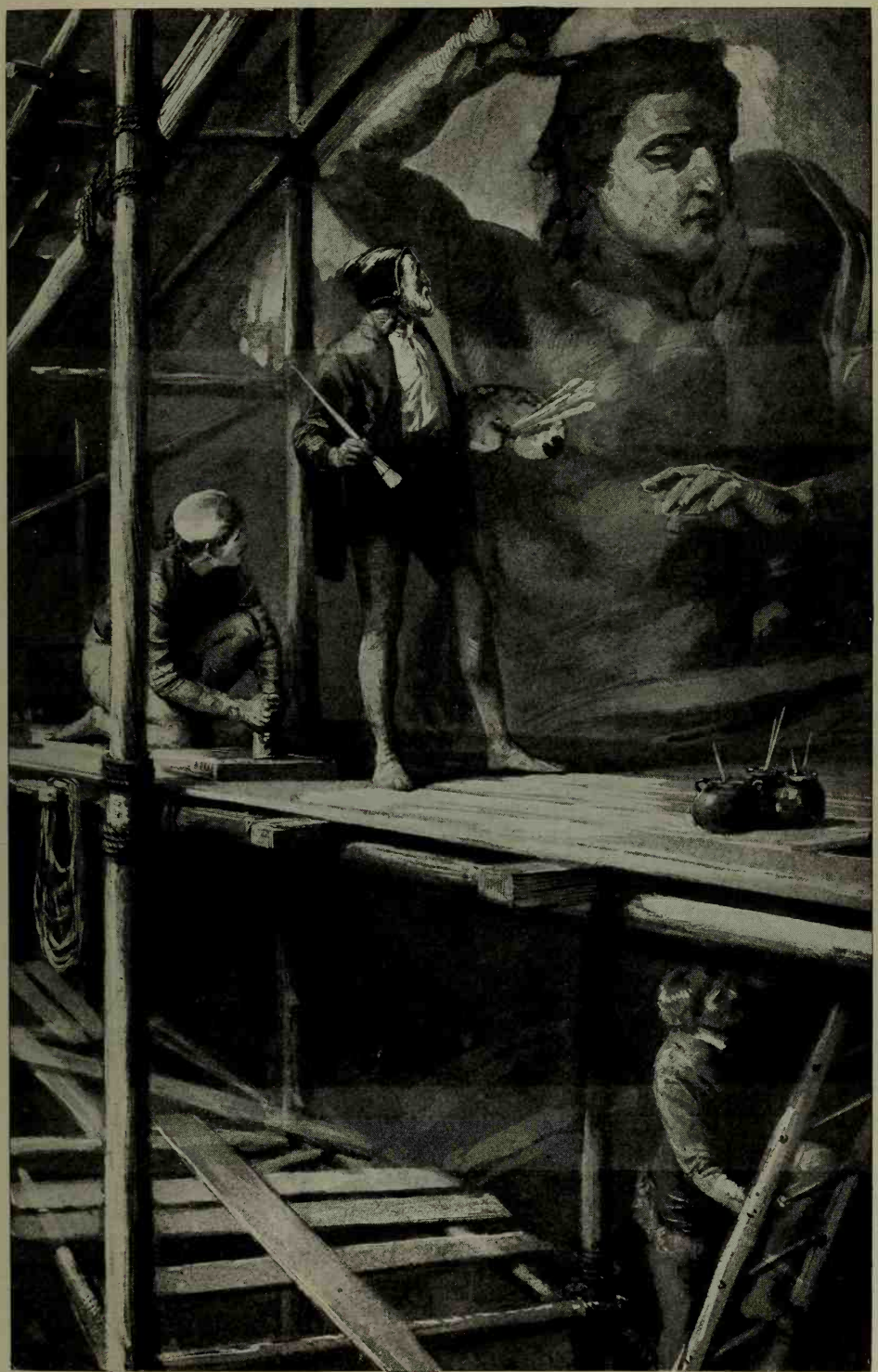
HOW RAPHAEL WAS INSPIRED BY THE WORK OF MICHAEL ANGELO

His work in Rome was interrupted for some years by his return to his own city of Florence. During these years a war occurred in which Florence was besieged, and Angelo was set to work to fortify the city against the enemy. When he at last settled down in Rome again, he resumed the work on the tomb of Pope Julius. He was eventually made architect for St. Peter's Cathedral, and designed the great dome.

He never married, but he loved a beautiful marchioness, and it was his love for her which inspired some of the most beautiful of his poems. He died when nearly eighty-nine years of age. To the last, though he was proud and reserved in his dealings with other men, he was always a humble student of his art. "I am still learning," this great man used to say right up to the time of his death.

One of the effects of Angelo's work was to inspire Raphael. The latter, born at Urbino in 1483, was only thirty when, famous for his work at Perugia and Florence, he was invited to Rome, and, like Michael Angelo, began work for the great Pope Julius II. He had already come under the influence of Michael Angelo and Leonardo, but

MICHAEL ANGELO AT WORK IN THE VATICAN



None but Michael Angelo could have conceived and painted the great picture of the Last Judgment, that stands out instinct with power and majesty on the wall of the Sistine Chapel. It never ceases to astonish men.

apparently it was not until Angelo's frescoes in the Sistine Chapel were unveiled that he felt the full effects of the master's genius. It carried a message and an inspiration to him that bore wonderful fruit. Not that he copied Angelo. He was too great to be a copyist. Many people think that he was the greatest painter that ever lived. He did not need to copy.

But we may be inspired by others less expert than ourselves, and though Raphael was perhaps a greater painter than Angelo, it was owing to the influence of the latter that there burst forth that light which was to illumine the remaining days of the young man.

The pope made him master architect of St. Peter's, the post to which, at Raphael's death, Angelo succeeded. He was also the foremost painter in rank as well as in achievement. He painted the famous frescoes at the Vatican, glorious pictures from Scripture, pictures for the tapestries in the cathedral at Arras, now world-famous, portraits, studies, sketches, and so on. No man ever produced a larger quantity of great work. He seemed to feel that he was not to live long, and that he must devote every hour to his work. It was well for mankind that he did, for he died when he was only thirty-seven years of age.

A GOOD MAN WHO WORKED HARD AND A BAD MAN WHO MADE BEAUTIFUL THINGS

In his all too short life he gave to Rome, and through Rome to the world, the most marvelous collections of paintings ever done by one human hand. He was mourned not only as a great artist, but as a greatly beloved man. Everybody admired him, and so gentle and sweet was his nature that it was said that the very animals loved him. Raphael's work is described on page 762.

Quite a different type of man from the men already mentioned was Benvenuto Cellini—of whom we read on pages 1215 and 4173—the goldsmith and sculptor, who won such fame from his work in Rome during the time of Clement VII. and Paul III. He was born in Florence in 1500, and died there in 1571, after wandering all over Italy and France.

His work was very beautiful, and on this account he was forgiven many crimes for which others would have been executed. He lived in rough, lawless days, but Cellini was worse than the average lawless man of his day, and thought nothing of slaying anyone with whom he quarreled. He wrote the story of his life, and it is considered to be one of the most remarkable works of its kind in the whole of the world's literature.

While Cellini was swinging his sword and plying his tools, his very opposite in character, Sebastian del Piombo, was quietly at work with his paintings and portraits. He was a native of Venice, it is supposed, and was born in 1485. A friend of Michael Angelo, it is believed by many that he had that great man's help in painting his "Resurrection of Lazarus," which now hangs in the National Gallery in London. He was a good, pious man, as well as a distinguished artist, and towards the close of his life became a priest. We know him best by his picture of Christopher Columbus which hangs in the Art Gallery of the Metropolitan Museum.

CLAUDE LORRAINE, THE GREAT PAINTER WHO COULD NOT BE A BAKER

Now we go forward to the seventeenth century, and in its first year we come upon a baby named Claude Gellée, who, being born at Chamagne, in Lorraine, is known to the world as Claude Lorraine. His father was a humble pastrycook, and as Claude grew up he wished to make him a pastrycook too. But the boy could not be made to learn. "He will never know how to heat an oven or bake pastry," his father grumbled.

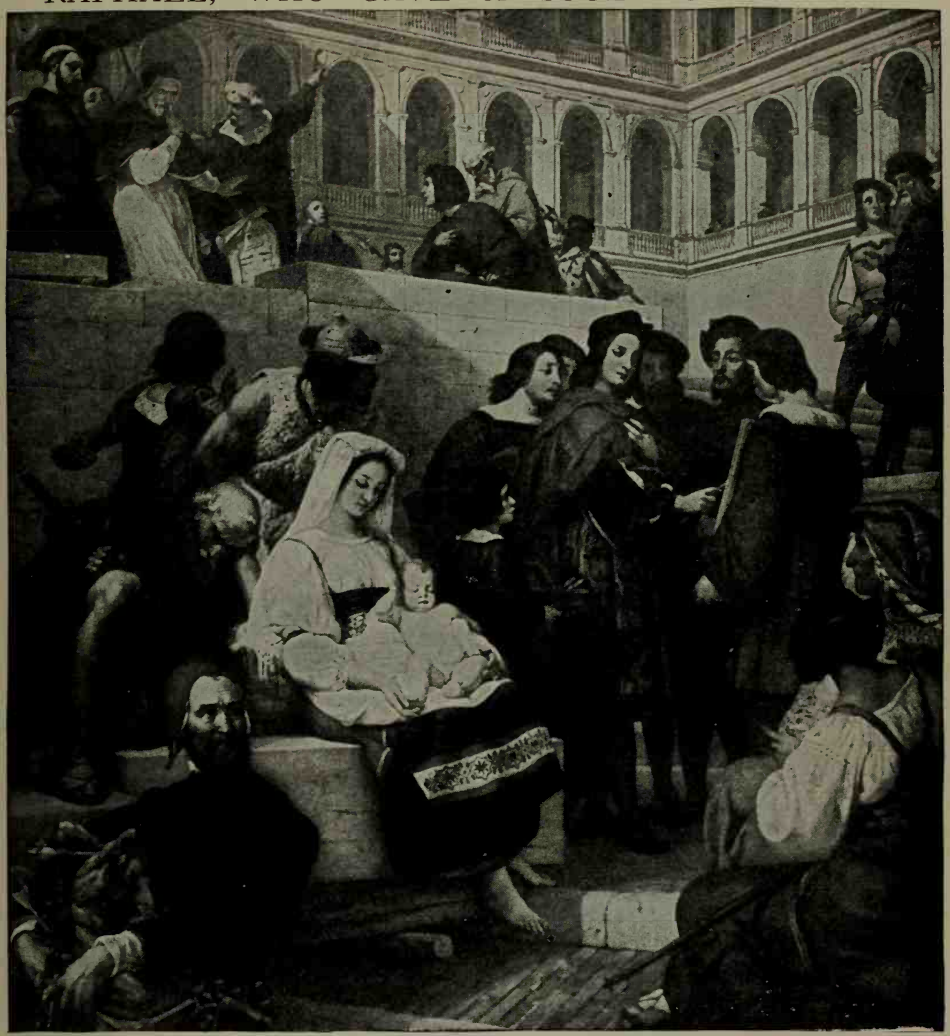
Claude's brother was a wood-carver, and thought the little chap would never be clever enough to follow that craft. "He's so silly that you had better make a priest of him, father," he said.

He suffered terribly at home, so one day, meeting a party of Flemish artists who were going to Rome to study, he decided to join them, and went first to Naples and afterward to Rome, where a landscape painter named Tassi let him grind his colors, and in return taught him to paint.

HOW CLAUDE LORRAINE WAITED FOR HIS OPPORTUNITY

He was not lazy, as his father had thought; here in the atmosphere of a studio, with all he loved, no day was too long for him, for he was now able to study art. He counted no time spent in the study of nature as lost, and would go into the fields and gaze with wonder and

RAPHAEL, WHO GAVE A SOUL TO PAINTING



Raphael gave a soul to Italian art by linking religion and beauty, and a famous writer speaks of his "godlike art." His figures glow with warmth and life. Raphael is here painting one of his Madonnas at Rome.

Raphael was at the very height of his fame and genius when he caught a chill, from which he died, in his thirty-seventh year, surrounded by friends and patrons. His death put the whole of Italy into mourning.

The photographs on these pages are by the Photochrome Company, Anderson, Alinari, and others.

delight on all he saw, from dawn to dusk. After some years of this life, he wandered forth on his travels, studying wherever he went. Returning again to Rome when twenty-seven, he started his career as a landscape artist. Progress was slow but sure, and at the end of ten years he was commissioned to paint a picture for Cardinal Bentivoglio, who introduced him to Pope Urban VIII., and this made his fortune. All good patrons of art were now anxious to have his works, but he would not readily part with them.

For one picture the pope offered him as much gold as would cover the canvas, but Lorraine would not sell it. Illness marred his later years, but to the end Lorraine was diligent and faithful to his art, and a warning to all fathers who think their sons too idle and stupid even to be pastrycooks or wood-carvers. He died in 1682.

SALVATOR ROSA, THE MERRY MAN WHO PAINTED SAD PICTURES

Another famous landscape painter of this time was Salvator Rosa, who was born at Arenella, near Naples, in 1615, and died in Rome in 1673. He received very little instruction, but wandered about studying Nature in her wildest aspects, and painted strong, gloomy, original pictures. That they should be gloomy is strange, for he had a mirthful mind. He was a brilliantly talented man, whose verses made fun of the great people of the time without fear or favor.

A painting called "Tityus Tortured by the Vulture" made Rosa famous at twenty-three, and he became the centre of a group of distinguished friends. But his verses got him into trouble, and he had to flee to Florence on pain of death.

THE BOY CANOVA, WHO MODELED A LION IN BUTTER

We must close our brief sketch with the story of Antonio Canova, the father of a new school of sculpture. He was born at Possagno, in Venetian territory, on November 1, 1757, and died in Venice on October 13, 1822. His father died when Antonio was only three years old, and the child was left to the care of his grandparents. A grand old man was his grandfather, who delighted to teach the child to model, and to indulge his fancy in the little workshop where the old man toiled as a stonecutter. At nine years of age, Canova was placed in the household of a nobleman, where he soon distinguished himself. It is said that once when there was to be a banquet at the house, one of the chief ornaments of the table, a great fancy dish, failed to arrive. The host was in despair, but little Canova beautifully modeled a lion in butter, with which everyone was delighted. The nobleman was so pleased that he sent the boy to a sculptor to be taught. With this man, and with a Venetian sculptor, he studied for three years, and then felt able to look after himself.

In the morning he studied in the academy or galleries. In the afternoon he worked for a sculptor. In the evening he read. Then he set up a little workshop in a cell under a monastery, and for four years he toiled and studied. At last he produced his first statue, and it set all the great art critics wondering. The Venetian senate sent him to Rome to study when he was twenty-three years of age.

Canova had carefully studied all the ancient classical statuary that he had seen, and he tried, while true to the best old traditions, to give his own work something of the charm of his own mind. It was a new and daring style, and proved that he was the greatest sculptor of his day.

WHAT CANOVA SAID ONE DAY AT THE BRITISH MUSEUM

For twenty years after this he worked at his art, doing much to raise sculpture from the low estate to which it had fallen. It was to him that Englishmen turned when the critics condemned the glorious Elgin Marbles at the British Museum. Canova went to London to see them, and declared them to be among the finest examples of Grecian art in the world. And as he looked upon these masterpieces of ancient days, the great sculptor said, in his modesty, that, after seeing these, he felt that his own work had been a failure.

Happily, the world does not agree. Although it does not approach in beauty the great work of older days, the world accords to Canova a high place in the assemblage of great geniuses who have helped to keep Rome in her place as the queen of all the cities—a glorious queen for what she was in the days long past, supreme in beauty and wonder through what more modern effort has made her.

THE NEXT MEN AND WOMEN BEGIN ON 5307.

MISS DOLLIE AND CAPTAIN BLUE

CONTINUED FROM 4994

BABS was a pretty little girl, with blue eyes and dark hair, but she had a great fault. She was very wilful, and when she did not get things all her own way she became bad-tempered.

One night she was sent to bed early for quarreling with her brother, Ronnie. For some time she lay quiet and still, cuddling her beautiful doll; and then, with another outburst of temper, she took poor Miss Dollie and gave her a severe beating.

"I don't love you any more," said Babs to Miss Dollie. "In fact, I don't love anybody!"

Rising up in bed, she flung her doll right across the room, and then snuggled down between the sheets and fell asleep.

Poor Miss Dollie fell face downwards in the corner of the room, and broke her nose. As she was a very sweet-tempered doll, she did not utter a word of complaint, but remained in the place where she had fallen. Half an hour later nurse came and put Ronnie to bed; and, after vainly calling twice to his sleeping sister, the little boy also fell asleep.

"How unhappy I am!" said Miss Dollie, when she saw that the two children were sleeping, and that she could talk without danger. "How unhappy I am! Just because I seldom speak, because I never eat much, and never break anything, and never cry, people imagine that I can't think, see, and feel. They are mistaken."

"They are indeed mistaken, Miss Dollie!" exclaimed Captain Blue, a very fine and handsome tin soldier, whom little Ronnie earlier in the morning had thrown into the same corner where Babs had flung her doll.

"Children fancy that, as we don't cry out when they hurt us, we never suffer. But we do suffer," he said, with a deep sigh. "Just look at my poor head! Ronnie has almost twisted it right off my shoulders."

"And just look at my nose!" said Miss Dollie. "Babs has broken it clean off. Is it worth while having real golden hair, and well-painted red cheeks, and blue eyes that open and shut, when one is ill-treated like this?"

"I am indeed very sorry for you, Miss Dollie," said Captain Blue; "but, alas! I cannot comfort you. I can no more glue your nose on than you can put my head straight. Toys we are—ill-treated toys—and toys we shall remain for ever and ever."

"No, no!" said the doll, in a strange and mysterious voice. "I certainly shall not remain a toy for ever, and neither, I hope, will you." Then, seeing that the tin soldier was now very curious, she added: "Would you like to hear the story of my life?"

"I dearly love to hear stories, Miss Dollie," said Captain Blue, "especially when they are real stories."

"Mine is a very real story," said the doll sadly. "My dear Captain Blue, I dare say you will scarcely

believe it, but I was not always a thing with a china face and a china body, and eyes that open and shut. Not very long ago I was a pretty little girl, and I lived in a beautiful house, and had more toys than I could play with. Unhappily, I was, like Babs, a very naughty girl, and at last I became a nuisance to everybody around me. One evening, when I had been sent to bed for poking my dollie's face into the fire, a fairy came into the nursery and changed me into a doll. 'A doll you shall remain,' she said, with a terrible look, 'until a little girl as naughty as you has inflicted on you the suffering that you have inflicted on others. And you shall not be restored to your proper shape,' the fairy went on, 'until this naughty little girl herself becomes a good little girl.'"

house with my wooden sword, knocking down everything in my way. I broke my mother's flower-vases, and upset my daddy's ink-well. So I was changed into a toy soldier, and I shall not be delivered from the spell until the naughty boy to whom I belong becomes a good boy. But I am beginning to despair of Ronnie. You see in me, Miss Dollie, the only survivor of a great army. Yes, I had forty-eight men under my command this morning, but Ronnie has already broken off all their heads, and he flung me into this corner because mine would not come off easily. It was this that made me say: 'Toys we are—ill-treated toys—and toys we shall remain for ever!'"

"For my part, as I have said," exclaimed Miss Dollie, "I still hope for

WHEN I HAD BEEN SENT TO BED, A FAIRY CAME AND CHANGED ME INTO A DOLL

"Well," said Captain Blue, glancing in pity at her broken nose, "I should say that the first part of your punishment is over."

"Yes," said Miss Dollie, "Babs is certainly as naughty as I ever was. But will she ever become a good little girl? I am afraid that the fairy will come and change her also into a doll. I dare say you know, Captain Blue, that all dolls are little girls who have been transformed because they became very, very naughty?"

"No," said Captain Blue, "I did not know that. But perhaps, Miss Dollie," he added, in a strange whisper, "you may not be aware of the fact that all toy soldiers are really little boys who have been transformed by an old wise magician. I was an exceedingly wicked little boy. I used to rush about the

better things. Have you not noticed how troubled the sleep of Babs has been since we began to talk? I am certain she has heard all we have said, for she is only in a sort of half-sleep. Of course, it seems to her just a dream; but she will remember it in the morning, and perhaps she will become a good girl, and get Ronnie to be a good boy."

And that is what happened. As soon as Babs woke up the next morning, she climbed on Ronnie's bed and told him her wonderful dream. Both the children resolved to be very good for the sake of the doll and the tin soldier; and when, a few days afterwards, their delighted mother took their broken toys away and replaced them with new ones, they knew that Miss Dollie and Captain Blue had at last been changed back into a little girl and little boy.

THE THIEF WHO TURNED POLICEMAN

WHEN Vidocq made up his mind to break away from the burden of his past, as we read on page 4989, there was only one way by which he could escape from prison and remain a free man. If he escaped by a hole in the wall, by bribery of jailers, by disguise, or by any other of the hundred and one ways which had made him notorious, it would only be to find himself hunted down by the whole police force. No; there was but one way. He must become a policeman himself.

So he made his offer to the Chief of Police at Paris, and was presently released. Instead of a convict he became a spy. He was free, but his freedom lay in capturing villains. So long as he lived, destiny seemed to insist that his life should have to do with crime. The Chief of Police let him free on condition that he brought a certain number of criminals to justice every month. His release was cleverly managed. He was taken from the prison in a car, and, wearing handcuffs, was driven at a rapid pace some distance through the city to a quiet place, where his handcuffs were taken off, and he was then allowed to escape. Far and wide spread the news that the notorious Vidocq had once more escaped; and Vidocq lived for some time in the company of thieves and other criminals in Paris and other places, making a study of their methods. How he must have smiled as they praised this last wonderful escape!

One of his first adventures was desperate. He received an invitation from a criminal named St. Germain to join with him and two others in raiding the house of a banker. St. Germain was not an ordinary burglar. He had been a clerk, was well-mannered, skilful, brave, and supposed to be a favorite in polite society. Vidocq thought to himself: "Here is a very easy plan for me to take all these scoundrels together"; and he consented to join the venture.

AS SOON AS THE CUNNING SEXTON LAID DOWN THE SPADE, VIDOCQ PICKED IT UP

But, to his discomfiture, he found that the burglary was to take place that night, and that St. Germain insisted on all four conspirators remaining at his lodgings till the hour came to sally out. Vidocq, therefore, had no chance of preparing a scheme; and, moreover, if caught by the police, he would have the greatest difficulty in proving satisfactorily to them that he was only working as a spy.

The others began to sharpen knives and clean pistols. Vidocq threw himself lazily upon a bed. He said presently that he had at his rooms some bottles

of good wine, which would make the hours pass. St. Germain offered to send for them. A porter was despatched to Vidocq's wife, telling her to bring the wine.

While this man was on his way, Vidocq, lying on the bed, wrote a secret line for Annette, his wife, telling her to follow him in disguise and pick up anything he dropped. When she arrived with the wine, pretending to kiss her, he slipped this little screw of paper unobserved into her hand. Later in the day he suggested that it would be a good thing to inspect the house they intended to rob while it was daylight. They knew it, but he did not. He liked to know where he was going.

The others agreed, and they went forth. Vidocq saw the place, and that was enough for him. On the way back, St. Germain entered a shop to buy black crêpe for their faces, and Vidocq hastily wrote a few lines for the police. As they walked home together, Vidocq dropped this paper, his wife picked it up, and a few minutes later it was in the hands of the police officials.

When it was midnight the four men started out. They made their way quickly through the deserted streets, and came presently to the wall surrounding the house. All was still. They donned their crêpe masks, and set to work. They climbed one by one up the wall. Three of them dropped noiselessly down into the shrubs on the other side. Vidocq remained for a moment astride the wall. Suddenly out of the bushes sprang a force of police. The burglars fired their pistols, injuring some of the police; and Vidocq rolled off the wall as if shot by a bullet. The burglars were captured, but Vidocq was unhurt.

And now comes the story of an old sexton, greatly trusted for his piety, and highly respected by the priest and people of his parish. The priest, fearing the coming of the Cossacks, determined to bury the church plate. Another parishioner, a rich goldsmith, determined to bury all his jewels with the sacred plate. Who but the pious sexton should dig the hole? The hole was dug, the treasure buried, and the sexton crawled off to his duties. But one day he came crying to the priest: "The hole! The hole!" And, lo! there it lay open and empty—the treasure gone! No one could discover the thief, and the matter was at last entrusted to Vidocq. When he had heard the story, he said: "Arrest the sexton." And the pious sexton was arrested on suspicion. Then Vidocq disguised himself as a Jew pedlar, and one day presented himself casually at the door of the sexton's cottage. He offered things to sell, and offered to buy anything the sexton's wife might have in the house. But the old woman offered neither plate nor jewel.

The next step was to disguise himself as a German valet, and to get arrested and thrown into the same cell as the old sexton. At first the sexton would have little to do with his fellow-prisoner, but when Vidocq showed him that he had a gold coin sewn inside each of his buttons, and when, further, he called for a bottle of wine, the sexton became more friendly, and they exchanged stories.

Vidocq said he had buried some valuables belonging to his master in a wood, and when he got out of prison he would get those valuables, escape to Germany, and live a merry life.

The sexton said that he was tired of his wife, and that if he could escape he, too, would go to Germany and live a merry life. Vidocq was now certain that the crafty old fellow had got the treasure. He instructed the police to move them to another prison, and to bind them so loosely that they could escape. This was done. The spy and the sexton escaped into the woods, and then the sexton came to the place where the treasure was buried.

A spade was concealed in some bushes, and with this he dug up the spoil. As soon as he laid down the spade, Vidocq picked it up and said quietly that he would knock the sexton on the head if he resisted. Marched off to prison, the old sexton kept on muttering to himself: "Who could have believed it? He looked so simple!"

For nearly twenty years Vidocq lived this exciting and dangerous life. It is asserted that he captured as many as 20,000 criminals in the rookeries of Paris alone. In 1812 Vidocq became the head of a detective agency in Paris, which proved successful; but it was thought that Vidocq himself originated many of the burglaries that he showed such ingenuity in detecting, so, after thirteen years in office, he was superseded.

After one or two other ventures in trade, Vidocq at length became a lecturer. He came as a lecturer to London, and was a marvelous success.

The author of "The Romance of History" says: "No spectator could forget the tall form, now grown portly, in drab breeches, white silk stockings, and shoes with silver buckles, the bull neck, the strange face sloping upwards like a pear, the ears pierced with slender gold rings, the grizzled hair, and the bushy brows above the steel-grey eyes which glittered like a lynx's. . . .He told the story of his life; he donned his chains, his galley dress, and the huge iron balls which he had worn at Brest; he brought forth relics of great malefactors, and as he told his stories he changed his face and decked himself in the disguise which he had worn on each occasion."

This extraordinary man lived to be eighty-two years of age, and kept himself in comfort to the end of his days by the money he had earned in London. It is quite clear that all his crimes were committed because the law did not try to make him better, but, on the other hand, made it impossible for him ever to do better. There was always some good in him, and he would undoubtedly have made a brave soldier. But the chance of a fresh start never came, and Vidocq lived all his life in an atmosphere of crime.

GOLDILOCKS AND THE GOLDEN CROWN

MANY years ago there was a poor herdsman who lived with his wife and his little son in a log-cabin in a great forest. The boy had long, yellow hair which shone like sunshine, and because of this he was called Goldilocks. One night he went to meet his father in the forest, and lost his way, and could not get back home. Happily, it was autumn, and there was an abundance of nuts, and blackberries growing on the trees and bushes, so Goldilocks did not want for food.

After wandering about for three days, he got into a wild, lonely place, where the trees grew so dense that he could scarcely make his way through them. Then, however, the forest thinned out, and Goldilocks came to the shore of a blue sea. Some fishermen were dragging their fishing-smack down the beach, and one of them caught sight of Goldilocks, and cried; "What a handsome boy! Let us take him with us. We want a lad in the boat."

Having now lost all hope of finding the log-cabin in which his father and mother lived, Goldilocks was feeling very sad and lonely, and he was glad to go with the fishermen. Though they fished a long time, they caught nothing.

At last an old fisherman with silver hair gave the net to Goldilocks, saying: "Now you try, my lad. Perhaps you will have better luck."

Naturally, Goldilocks did not know how to handle the net; he let it down in a tangle, and it seemed to catch on some rock in the deep water. Blushing with shame at his awkwardness, the boy set his foot against the bulwark, and tugged furiously at the net, and at last brought it up. No wonder it had felt heavy, for glittering in its meshes was a crown of pure gold.

"Hail, O King!" cried the old fisherman, kneeling down at the feet of Goldilocks. "It is now a hundred years ago," he said to the astonished boy, "that the last of our kings died. Having no heir to succeed him, he cast his crown into the sea, and declared that his throne must remain unoccupied until some happy person won it by recovering the crown."

The fishermen at once turned their boat in towards the shore, and Goldilocks stood at the prow with the bright crown glittering on his head. News of his success resounded from ship to ship, and traveled over the sea and across the land. Multitudes of people came to meet him, singing for joy and waving green branches, and strewing his path with flowers.

On reaching his magnificent palace, which stood in the centre of a rich and noble city, Goldilocks at once sent a thousand of his best soldiers into the forest. At the end of a week they returned in triumph, bringing Goldilocks' mother and father with them, who could scarcely believe the good fortune of their little son, until at last they saw him, surrounded by many courtiers, sitting on the throne with a a golden crown upon his head.

THE MARCH OF THE TEN THOUSAND

OF all the successful struggles against overwhelming odds that history relates, few can compare with the great march known as "The Retreat of the Ten Thousand." Famous in ancient times as a wonderful military achievement, it remains to this day a stirring record of courage and endurance.

In 401 B. C., Cyrus, son of Darius, made war against his brother Artaxerxes, who had succeeded to the throne of Persia. By various pretexts and deceptions he secured the services of about thirteen thousand Greeks, who marched with the rest of his army into Asia. At Cunaxa, near Babylon, Cyrus was defeated and slain, and the Greeks found themselves alone in the heart of a hostile continent. They endeavored to come to an agreement with Tissaphernes, the victorious general, to allow them to return safely. Tissaphernes met them with fair words; but when he had won their confidence he invited their leaders to a magnificent banquet and treacherously slew all who came.

We may picture the plight of the unfortunate Greek army, deprived of many of their leaders, thousands of miles from home and kindred, and surrounded on all sides by hostile forces. It was impossible for them to push on into the unknown country; it was impossible for them to remain where they were. There was nothing for them but retreat, and retreat involved a long and terrible march through rough lands peopled by savage races. For the moment they were in the depths of despair.

In this perilous moment, when all seemed lost, a leader was found—a man who had joined the army as a simple volunteer for love of adventure. As the soldiers lay about listless and dejected, Xenophon, an Athenian knight, asked himself: "Why do I lie here? The night is creeping on. The morning will probably bring the enemy, and defeat will be followed by insults, torture, and death. Am I to wait and do nothing until some officer comes forward to give counsel and to act? To whom am I to look for this; and am I not old enough for the task?"

He arose and summoned the captains. To them he explained the danger of their position, and showed them that their only hope lay in their weapons and right arms. He himself, he said, was willing either to follow or to lead. His eloquence won them over. They acclaimed him as their leader, and at once preparations were made for the retreat.

The wonderful march began. All the baggage that could be spared was burned, in order to leave as many soldiers as possible ready for action. Their course was marked out for them—they could only strive to reach the coast. They crossed a broad river, and encountered the first attack of the enemy. Slingers and mounted bowmen, whose weapons carried farther than those of the Greeks, hung on their rear and flanks and harassed them. Xenophon tried to repel the attack, but was defeated with great loss. To restore the spirit of his men, the leader took the blame of the defeat on himself and reorganized his forces.

The Greeks marched on. Soon they came to a country which presented enormous difficulties to their retreat. Their hearts sank as they saw the terrible rocks and narrow ravines of a land inhabited by a fierce fighting race of hillmen. Had they once been caught in the narrow passes of this country, they would have been overwhelmed. They could only escape destruction by moving with almost incredible swiftness from height to height before the enemy could reach them.

Day after day they made their gallant marches till wild Armenia stretched before them. This country was swept by great winds and heavy snows, making it almost impassable. Moreover, the Greeks were crossing it at the most terrible season of the year—the winter.

Buffeted by tempests, drenched and blinded by raging snows, they struggled along. Their wonderful spirit urged them on; and not only did they repel the attacks of their foes, but they assumed the offensive, stormed the camp of the ruler of the province, and carried away much booty.

Then they crossed the Euphrates near its source, and encountered a wind of piercing coldness, while they forced their way with dogged persistence through snow that lay six feet deep.

THERE IN THE DISTANCE LAY BEFORE THEIR GAZE THE BLUE WATERS OF THE EUXINE SEA

On they pressed, hampered by the presence of many sick and wounded soldiers. Behind them were the enemy, ready to fall upon them at any moment. A feigned attack drove these away, and the Greeks began to approach the plains.

Their way was now impeded by a river, which they crossed, only to find that the pass leading to the open country beyond was blocked by the tribesmen of the district. Although hampered by their ignorance of the country, and fighting in the darkness of night, they carried the pass and emerged victorious into the plain.

Another river lay in their path. They crossed it, and neared a large town, the inhabitants of which sent a guide to direct them. For five days they followed the guide, and then they saw before them Mount Theches. The tired and sorely tried warriors climbed painfully to its summit, and there in the distance lay before their gaze the blue waters of the Euxine Sea, which we now call the Black Sea.

The pent-up emotion of the long march burst forth, and the men, crying "The sea! The sea!" threw themselves into one another's arms. Then, with a sudden impulse, they set themselves to gather stones; and where they first gazed upon the sea they raised a mighty monument. The remnant of the ten thousand had forced their way to safety!

Even now their troubles were not ended. They had reached the sea, but transports could not be found for all of them, and the fearful prospect of being compelled to march along the shores of the Black Sea made them discontented and almost mutinous. The sick men and those men over forty years of age were taken on ships, while the rest of the army marched to the nearest port.

Here a review was held, and it was found that about six thousand men still survived. About three thousand men had been lost at Cunaxa and nearly four thousand on the grim march. This number was small indeed when the terrible forced marches they had undergone and the dread regions they had passed through are considered.

Their fame spread from one Greek city to another. Their exploit left a wonderful impression on the Greek world, but, although their monument of stones at Mount Theches has long been leveled to the dust, the memory of the gallant and laborious march lives wherever bravery and courage are honored.

THE MAGIC BOX

LONG, long ago, when this old world was very young, there was a child, named Epimetheus, who never had either father or mother; and, as he was very lonely, another child was sent from a far country to live with him and keep him company. Her name was Pandora.

The first thing that Pandora saw, when she entered the cottage where Epimetheus dwelt, was a great box. And almost the first question which she asked him, after crossing the threshold, was this,—

"Epimetheus, what have you in that box?"

"My dear little Pandora," answered Epimetheus, "that is a secret. The box was left here to be kept safely, and I do not myself know what it contains."

"But who gave it to you?" asked Pandora. "And where did it come from?"

"It was left at the door," replied Epimetheus, "just before you came, by a person who looked very smiling and intelligent, and who could hardly forbear laughing as he put it down."

"I know him," said Pandora, thoughtfully. "It was Quicksilver; and he brought me hither, as well as the box. No doubt he intended it for me; and, most probably, it contains pretty dresses for me to wear, or toys for you and me to play with, or something very nice for us both to eat!"

"Perhaps so," answered Epimetheus, turning away. "But until Quicksilver comes back and tells us so, we have neither of us any right to lift the lid of the box."

"What a dull boy he is!" muttered Pandora, as Epimetheus left the cottage. "I do wish he had a little more enterprise."

After Epimetheus was gone, Pandora stood gazing at the box.

Its edges and corners were carved with most wonderful skill. Around the margin there were figures of graceful men and women, and the prettiest children ever seen. . . . The most beautiful face of all was done in what is called high relief, in the centre of the lid. There was nothing else whatever on the lid save the dark, smooth richness of the polished wood, and this one face in the centre, with a garland of flowers about its brow. . . .

The box, I had almost forgotten to say, was fastened; not by a lock, nor by any other such contrivance, but by a very intricate knot of gold cord. Never was a knot so cunningly twisted, nor with so many ins and outs, which roguishly defied the skilfulest fingers to disentangle them. And yet, by the very difficulty that there was in it, Pandora was the more tempted to examine the knot, and just see how it was made.

"I really believe," said she to herself, "that I begin to see how it was done. Nay, perhaps I could tie it up again, after undoing it. There would be no harm in that, surely."

First, however, she tried to lift it. She raised one end of the box a few inches from the floor, and let it fall again with a pretty loud thump. A moment afterwards, she almost fancied that she heard something stir inside of the box. She applied her ear as closely as possible and listened. Positively, there did seem to be a kind of stifled murmur within! . . .

As she drew back her head, her eyes fell upon the knot of gold cord.

"It must have been a very ingenious person who tied this knot," said Pandora to herself. "But I think I can untie it."

Meanwhile, the bright sunshine came through the open window. Pandora stopped to listen. . . . But just then, by the merest accident, she gave the knot a kind of a twist. The gold cord untwined itself, as if by magic, and left the box without a fastening.

"This is the strangest thing I ever knew!" said Pandora. "What will Epimetheus say? And how can I possibly tie it up again?"

She made one or two attempts to restore the knot, but soon found it quite beyond her skill. . . . Nothing was to be done, therefore, but to let the box remain as it was until Epimetheus should come in.

And then the thought came into her naughty little heart, that, since she

would be suspected of having looked in the box, she might just as well do so at once. . . . She could not tell whether it was fancy or no; but there was quite a little tumult of whispers in her ear,—

"Let us out, dear Pandora,—pray let us out! We will be such nice pretty playfellows for you! Only let us out!"

"What can it be?" thought Pandora. "Is there something alive in the box? Well!—yes!—I am resolved to take just one peep! Only one peep; and then the lid shall be shut down as safely as ever!"

But it is now time for us to inquire into what Epimetheus was doing meanwhile.

This was the first time, since his little playmate had come to dwell with him, that he had attempted to enjoy any pleasure in which she did not partake. But somehow nothing seemed to go right; nor was he nearly so happy as on other days. . . .

At length, discovering that, somehow or other, he put a stop to all the play, Epimetheus decided it was best to go back to Pandora.

At the moment of his entering the cottage, the naughty child had put her hand to the lid, and was on the point of opening the mysterious box. Epimetheus watched her. If he had cried out, Pandora would probably have withdrawn her hand, and the fatal mystery of the box might never have been known. . . .

As Pandora raised the lid, the cottage grew very dark and dismal; for a black cloud had now swept quite over the sun, and seemed to have buried it alive. There had, for a little while past, been a low growling and muttering, which all at once broke into a heavy peal of thunder . . . . But Pandora, heeding nothing of all this, lifted the lid nearly upright, and looked inside. It seemed as if a sudden swarm of winged creatures brushed past her, taking flight out of the box, while, at the same instant, she heard the voice of Epimetheus, speaking with a lamentable tone, as if he were in pain.

"Oh, I am stung!" cried he. "I am stung! Naughty Pandora! why have you opened this wicked box?"

Pandora quickly closed the cover, and, starting up, looked about her, to see what had befallen Epimetheus. The thunder-cloud had so darkened the room that she could not very clearly discern what was in it. But she heard a disagreeable buzzing, as of a great many huge flies, or gigantic mosquitoes. And, as her eyes grew more accustomed to the imperfect light, she saw a crowd of ugly little shapes, with bats' wings, looking abominably spiteful, and armed with terribly long stings in their tails. It was one of these that had stung Epimetheus. Nor was it a great while before Pandora herself began to scream, in no less pain and fear than her play fellow, and making a great deal more hubbub about it. An odious little monster had settled on her forehead, and would have stung her I know not how deeply and would have done her real harm, if Epimetheus had not run and brushed it away.

Now, if you wish to know what these ugly things might be, which had made their escape out of the box, I must tell you that they were the whole family of earthly Troubles. There were evil Passions; there were a great many species of Cares; there were more than a hundred and fifty Sorrows; there were Diseases in a vast number of miserable and painful shapes; there were more kinds of Naughtiness than it would be of any use to talk about. . . .

Meanwhile, both Pandora and Epimetheus had been grievously stung, and were in a good deal of pain, which seemed the more intolerable to them, because it was the very first pain that had ever been felt since the world began. Besides all this, they were exceedingly cross, both with themselves and with one another. In order to indulge it to the utmost, Epimetheus sat down sullenly in a corner with his back towards Pandora; while Pandora flung herself upon the floor and rested her head upon the fatal and abominable box. She was crying bitterly, and sobbing as if her heart would break.

Suddenly there was a gentle little tap on the inside of the lid.

"What can that be?" cried Pandora, lifting her head.

But either Epimetheus had not heard the tap, or was too much out of humor to notice it. At any rate, he made no answer.

"You are very unkind," said Pandora,

commencing to sob anew, "not to speak to me!"

Again the tap! It sounded like the tiny knuckles of a fairy's hand, knocking lightly and playfully on the inside of the box.

"Who are you?" asked Pandora with a little of her former curiosity. "Who are you, inside of this naughty box?"

A sweet little voice spoke from within,—

"Only lift the lid, and you shall see."

"No, no," answered Pandora, again beginning to sob, "there was quite trouble enough when I opened the lid before! You are inside of the box, naughty creature, and there you shall stay!" . . .

She looked towards Epimetheus, as she spoke, perhaps expecting that he would commend her for her wisdom. But the sullen boy only muttered that she was wise a little too late.

"Ah," said the sweet little voice again, "you had much better let me out. I am not like those naughty creatures that have stings in their tails. . . . Come, come, my pretty Pandora! I am sure you will let me out!"

And, indeed, there was a kind of cheerful witchery in the tone, that made it almost impossible to refuse anything which this little voice asked. Pandora's heart had insensibly grown lighter at every word that came from within the box. Epimetheus, too, though still in the corner, had turned half round, and seemed to be in rather better spirits than before.

"My dear Epimetheus," cried Pandora, "have you heard this little voice?"

"Yes, to be sure I have," answered he, but in no very good humor as yet. "And what of it?"

"Shall I lift the lid again?" asked Pandora.

"Just as you please," said Epimetheus. "You have done so much mischief already, that perhaps you may as well do a little more." . .

"You might speak a little more kindly!" murmured Pandora, wiping her eyes.

"Ah, naughty boy!" cried the little voice within the box, in an arch and laughing tone. "He knows he is longing to see me. Come, my dear Pandora, lift up the lid. I am in a great hurry to comfort you." . . .

"Epimetheus," exclaimed Pandora, "come what may, I am resolved to open the box!"

"And as the lid seems to be so very heavy," cried Epimetheus, running across the room, "I will help you to open it!"

So, with one consent, the two children again lifted the lid. To their surprise out flew a sunny and smiling little personage, and hovered here and there about the room, throwing a light wherever she went. . . . She flew to Epimetheus, and laid the least touch of her finger on the inflamed spot where the Trouble had stung him, and immediately, like magic, the anguish of it was gone. Then she kissed Pandora on the forehead, and her hurt was cured likewise. . . .

"Pray, who are you and what is your name, beautiful creature?" inquired Pandora.

"I am to be called Hope!" answered the sunshiny figure.

"Your wings are colored like the rainbow!" exclaimed Pandora. "How very beautiful!"

"Yes, they are like the rainbow," said Hope, "because, glad as my nature is, I am partly made of tears as well as smiles."

"And you will promise to stay with us," asked Epimetheus, "for ever and ever?"

"As long as you need me," said Hope, with her pleasant smile,—"and that will be as long as you live in the world, —I promise never to desert you. . . . Yes, my dear children, and I know something very good and beautiful that is to be given you hereafter!"

"Oh, tell us," they exclaimed,— "Tell us what it is!"

"Do not ask me," replied Hope, putting her finger on her rosy mouth. "But do not despair, even if it should never happen while you live on this earth. Trust in the promise, for it is true."

"We do trust you!" cried Epimetheus and Pandora together, both in one breath.

And so they did; and not only they, but so has everybody trusted Hope, that has since been alive.

CHILD ROLAND TO THE DARK TOWER CAME

ONLY a few wise old peasant women still remember the story of "Child Roland," and relate it to their children by the winter fire; but it seems to have been one of the favorite fairy tales of Shakespeare, and in "King Lear" he brings in a line from an ancient ballad,

Child Roland to the dark tower came,

which none of the learned editors of his plays was able to explain. For the ancient ballad is now forgotten.

Child Roland, they say, was one of the sons of King Arthur; he had two elder brothers, and a young and beautiful sister, Lady Ellen. One day they were all playing at ball in merry Carlisle, and Child Roland gave the ball such a powerful kick that he sent it right over the church.

Lady Ellen went to get it, and did not come back. Her brothers looked for her up and down Carlisle, but they could not find her; and at last the elder brother went to the famous wizard, Merlin, and asked him if he knew where his sister was.

"Fair Lady Ellen," said Merlin, "has been carried away by the fairies. She is now in the castle of the King of Elfland. There is not a knight in Christendom that could set her free."

The two elder brothers, however, bravely resolved to attempt to rescue their sister, and, after receiving much wise advice from Merlin, they set out on their perilous enterprise, but did not return.

Child Roland then went to Merlin's cave, and begged for help and counsel, for he, too, was determined to risk his life in seeking for his beautiful sister. The good wizard showed him how to get to the Land of Faerie, and added: "And when you get into the Land of Faerie, there is one thing you must not do. You must not touch food or drink. Upon this everything depends."

REACHING THE GREEN HILL, CHILD ROLAND FOLLOWED THE DIRECTIONS OF THE HENWIFE

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On coming to the Land of Faerie, Child Roland saw a fairy herdsman and said to him:

"Can you tell me where is the castle of the King of Elfland?"

"I cannot," replied the fairy herdsman. "But you will find a shepherd farther on, and perhaps he will know where the castle is situated."

Coming up to the shepherd, Child Roland asked him the same question, and was told to go to the henwife in the valley.

"Ride on," said the fairy henwife, when he came to her, "till you arrive at a green hill, encircled from top to

bottom with terraces. Three times must you go withershins round it, saying: 'Open, door, and let me in!' The door will then open."

What troubled Child Roland was the word "withershins," but on reaching the green hill he remembered that it was a magical movement. In order to go withershins, as the witches do, you must go from west to east, instead of from east to west, as the sun and the moon and the stars go.

Child Roland followed the directions that were given by the fairy henwife, and a door opened in the green hill, and closed behind him as he ran up a long passage leading to the palace of the King of Elfland.

He came to an immense hall upheld by pillars of gold and silver, and arches of diamonds. Hanging on a golden chain from the middle of the roof was a large, hollow, transparent pearl, and in the pearl was a magic carbuncle which lighted up the hall with a beautiful radiance. Rubies and emeralds flashed and flamed everywhere, and at the end of the hall Lady Ellen was sitting under a canopy, combing her golden hair with a silver comb.

"Go back, Roland!" she cried. "Go back! If you had a hundred thousand lives, you could not win me back from the wicked King of Elfland."

Then, seeing that he was tired and hungry, she gave him a golden bowl full of delicious fairy milk and tempting fairy bread.

But as Child Roland raised the bowl to his lips, he remembered that if he tasted fairy food he would never see the light of the sun again.

"I will neither eat nor drink!" he exclaimed, flinging the bowl on the floor, "until I succeed in setting you free!"

With the sound of thunder the King of Elfland burst into the hall, and looked around him furiously.

"If I cannot take you alive, I will have you dead!" he roared.

Child Roland drew his father's magic sword, Excalibur, and rushed upon the king. They fought savagely and desperately for a long time, and at length, after a furious battle, Roland struck the king to the ground.

"Spare me!" cried the King of Elfland, "and I will not only set your sister free, but let your brothers depart also, and no harm shall befall them."

To this Child Roland joyfully agreed, and he returned in triumph to Carlisle with his two brothers and Lady Ellen.

THE PRINCESS'S WEDDING FEAST

"WHAT is the sweetest thing in the world?" said a father one day to his two daughters.

"Sugar," said the elder girl.

"Salt," said his younger and prettier daughter.

Her father thought she was mocking him, but she held to her opinion, and a quarrel broke out between them over this trifling matter, and he at last pushed her out of the house, saying:

"As you hold that salt is sweeter than sugar, you had better find another home where the cooking is more to your taste!"

It was a beautiful summer night, and as the pretty maiden sat singing merrily in the forest around her father's cottage, a young prince, who had lost himself while hunting the deer, heard her voice, and came to ask her the way. Then, struck by her beauty and gaiety, he fell in love with her, and took her home to his beautiful palace, and married her.

The bride invited her father to the wedding banquet, without telling him that she was his daughter. All the dishes were prepared without salt, and the guests became very dissatisfied and began to murmur as they ate the tasteless food.

"There is no salt in the meat!" they shouted.

"Ah," said the bride's father, "salt is truly the sweetest thing in the world! But when my daughter said so, I turned her out of my house. Oh, if I could only see her again, and tell her how sorry I am!"

Drawing the bridal veil from her face, the happy girl went up to her father and kissed him. And properly salted dishes of fish, flesh, and fowl were then brought in, and the marriage feast became quite joyful, and all the guests were very happy and satisfied.

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GAMES TO PLAY ON THE BEACH

CONTINUED FROM 5037

WE all look forward to our holidays at the seaside, and our first desire when we reach our destination is to get down to the beach with spade and pail, and to build castles of sand with trenches all round. A great deal of fun and amusement is to be obtained from castle-building, especially if there is a party of boys and girls. In this case it is better, instead of trying to build an elaborate castle which shall be a model of a real castle, to pile up sand into a great heap, and dig a deep trench all round, and then, dividing the party equally, to play "King of the Castle." One side holds the fort while the other tries to take it by storm, and, as the sand is soft, we do not hurt ourselves at all as we fall down or get pushed from the castle. For this game we should select a spot where there are no rocks nor big stones, and where the sand is dry. The bigger the castle that we build up, the greater will be the fun. The attacking side may be considered to have won the game when they have turned all the members of the other side off the castle or a flag may be posted in the middle of the fort, and if the attacking side can seize the flag and take it away, they may be considered victorious.

If there are only two or three of us—not sufficient to form sides for playing the "King of the Castle"—then it is better to build a castle which shall be a good model of a real castle. We must decide upon the shape that the castle is to be, and a very good style is a castle with a round tower at each of its four angles, the tower to be joined up with walls. The tops of the towers and walls should have battlements, and these may be cut, after the castle is built, with an old knife. For scooping out gateways and windows in the walls, an old iron spoon is very useful. For model castles of this kind, it is wise to use wet sand, which will cling well together; otherwise, if we use dry sand, the castle is sure to collapse when we begin scooping out gateways and windows. If there is no wet sand available, we can easily sprinkle seawater from our pails over the dry sand. The beauty of the castle will, of course, depend largely on the skill and artistic taste of the builders, but it is surprising what perfect models of castles can be built in sand upon the sandy beach.

A TRENCH-DIGGING COMPETITION

An excellent game for the beach is trench - digging, and we can easily arrange a competition in which the one who digs the largest and deepest trench in a given time shall be declared the winner. Or we might make the competition one in which a hole or pit of a certain diameter and depth has to be dug and filled with water from the sea, the sea being allowed to run into a hole through a trench which each competitor must dig. The one whose pit gets filled with water first is declared the winner. Of course in a competition of this kind the spades of the competitors should all be alike as to size and material. It is much easier to dig with a large metal spade

than it is to dig with quite a small wooden one. A tug-of-war is always exciting, but it is more exciting than ever when played on the beach. The sand makes the result very uncertain. At one time it enables the competitors to get an apparently firm foothold, and then it suddenly and treacherously gives way, so that the ground gained or held is lost. The competitors may, of course, wear their shoes or be barefooted, but all competitors should be alike in this respect—that is, if any are barefooted, all should be. Then, again, the sand being so soft, a fall does not hurt us in any way. If the tug-of-war is pulled barefooted, we must be careful to choose a part of the beach where the beach because of pebbles and rocks, we can arrange a steeplechase, and there is much excitement in climbing over these obstacles. We must be careful, however, that in the excitement of the race we do not fall. The sand may be high up on one side of a groin or rock, and far down on the other, so that care must be exercised in climbing over.

On a beach where there are plenty of pebbles mixed with the sand, a good game is to select some short sentence, and collect white pebbles and form the words on the sand with these pebbles. The one who succeeds in first forming completely and artistically the sentence that has been selected wins the game.

A WORD-FORMING GAME

SIGNALING WITH FLAGS

there are no pieces of glass or broken shells. A mark such as a band of seaweed, must be put midway between the two sides before they start pulling, and the side that pulls any of its opponents over this mark is the winner.

If a long, clean stretch of sand can be found on the beach, some good races may be run, with the competitors either barefooted or wearing shoes. The results of these races on the beach are always uncertain, because running on sand is very different from running on the pavement or an ordinary road or a field, and far more difficult. When there is no clear track of any considerable length for running on

Boy and girl scouts, and those interested in scouting games, can have plenty of amusement on the beach, especially if there are boulders behind which to hide. Then we shall find the beach an excellent place in which to do signaling, and, owing to the clearness of the air by the sea, we can signal across long distances.

These are only a few of the many games that may be played on the beach, and we shall find that if we organize our play—that is, engage in definite games—the time passes much more pleasantly than if we have no regular and settled system of playing definitely.

GAMES FOR BOYS

ROOSTER FIGHT

THIS is a very old game and is played by two contestants, who stand within a ring about six feet in diameter. Each boy reaches down and grasps his own ankles. Holding this position, the boys try to use their shoulders to thrust each other out of the circle. The player wins who first succeeds in overthrowing the other, or causing him to loose his grasp on his ankles.

SHOULDER SHOVE

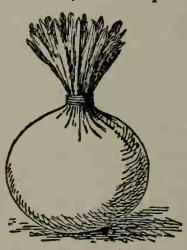
THIS is played by a group of four players who stand in a circle about eight feet in diameter and a fifth player who stands in the centre. The four in the circle fold their arms across the chest, and hop on only one foot. The fifth one, who is "It," may stand on both feet and is privileged to use both his arms. The object of the game is for the four players using only their shoulders to push the fifth out of the circle. He may avoid them by dodging or running. If he is thrust out of the circle, the four hoppers are considered to have won. If one of the hoppers places both feet on the floor or attempts to unfold his arms, he must leave the circle. This game is great sport, especially for the boys.

BOUNDARY TUG

TWO boys stand between lines drawn five feet apart, each grasping the end of a cane or stick. They take a position face to face, the right toes touching, each boy stepping backward in a strong stride with the left foot. The object of this game is to pull the opponent across a boundary line.

MAKING LEAF PICTURES ON WOOD

THOSE who have never tried to make leaf pictures will be surprised to find what pretty effects can be got with a very little labor and practically no expense. Some people make a hobby of collecting impressions of foliage and mounting them in albums, just as they collect postage stamps; others use the pictures to decorate these albums. But the most charming way to use these leaf pictures is to decorate white wood furniture—brackets, little bookcases, and such household things—with an impression which is stamped on the wood straight away in color.



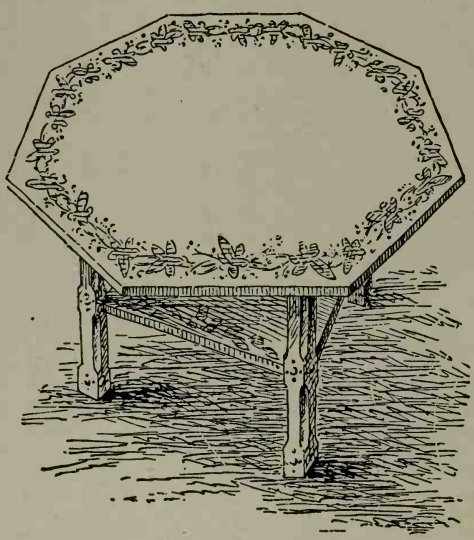
The pad.

The things we need for these pictures are quite simple. The leaves themselves can be found everywhere, but chiefly, of course, in the spring and summer. If you have a garden you will find plenty there. If not, get a box with a lid to it, sprinkle the inside of the box with water to make it damp, and take it with you the first time you go out for a walk. Perhaps you will come to a lilac bush and find a few perfect flat leaves. Pluck these and put them in the box. An elm or an oak tree, or more probably a plane tree, with its handsome leaves, will yield a few perfect leaves. These you also put in the box, keeping the leaves moist by shutting the lid on them. Blackberry bushes, currant and gooseberry bushes have leaves which give splendid pictures if you choose those which lie flat without folding on themselves.

First we shall need some sheets of foolscap paper, blue or white, some very fine muslin, and a large handful of soft cotton.

Double the muslin in two, to about the size of a dessert plate; take enough of the cotton-wool to make a tightly squeezed mass the size of a base-ball, and tie this mass firmly in the muslin, so that the edges of the muslin form a kind of handle.

We also want tubes of oil-colors. The cheaper colors will do just as well as the dearer ones for our purpose, and cost only a few cents a tube.



A wooden table decorated with leaf pictures.

To start, get a tube of burnt sienna oil-color—an orange brown, which lends itself to the process—and next a few sheets of cartridge paper. Cut them up in pieces about the size to take the leaves you are going to print from. Fold the pieces in halves, so that when the leaves are ready they can be placed between the folded sheets.

Having got the leaves in the box, the ball of cotton-wool in muslin, the foolscap paper, the tube of color, and the folded sheets of cartridge paper, begin by squeezing out a little of the color on to the middle of the foolscap sheet. Dab it with the ball till the color is evenly and thinly spread upon the paper, and has stained evenly the lower side of the ball. Do not use too much paint—only just enough to give a stain. Take out and thoroughly dry one of the leaves, which will lie quite flat upon the table. Then put this leaf upon another sheet of paper, strike it quite hard with the ball till every part of the leaf receives an equal quantity of color. You can hold the leaf by its stalk while you do this. Take up fresh color on your pad from the foolscap as it is wanted.

When you think the leaf is evenly covered with color, place it carefully between a folded piece of the cartridge paper. Lower the upper part down upon the leaf and hold it firmly with the left hand. Wrap the forefinger of the right hand in the fold of an old handkerchief, and rub the paper which holds the leaf. You may rub hard, but rub evenly, and when you think you have rubbed all over the leaf—its edges and veins, and as close to the large veins as you can get—lift the paper and take out the leaf. You will now have a picture of the leaf drawn by itself upon the cartridge paper. If, before you put the leaf in between the folds, you dab the lower side of the leaf as well as the upper, you will then have two pictures—one of the strongly-veined back of the leaf, and the other of the smoother and, possibly, hairy side of the leaf. Try to get a good impression of one side of a leaf before attempting the more difficult task of obtaining the two sides with one rubbing.

Do not be discouraged if your first attempt is not good. One has to learn how much color to spread upon the paper, how much color to let the dabber take up, when the leaf is sufficiently and evenly coated, and, last of all, how much and how hard to rub. One has also to learn to lay the painted leaf on the paper so that it does not smudge. Some leaves, again, take a great deal of color to give a good impression; others will coat quite readily.

In doing the backs of leaves where the veins stand out quite distinctly, it requires some hard hitting with the pad to get the color on the veins which lie between the thick veins. Hit hard and do not mind the leaf. Then, when this leaf is between the

folded paper, rub hard to get the impression off.

When you have succeeded in getting a good impression, you may think of getting some variety in the color. One charm of this pastime is that you may use any oil-color you like, mix any color you like, and when you become expert you may use more than one color on the leaf, and so get some of the beauty of the autumn tints of leaves.

Each color will require its own pad and foolscap, however. If the color leaves the tube thick and unworkable, mix a little sweet oil with it to thin it. By getting the proper colors you get greens, reds, oranges, blues, or combinations of these colors. Get tubes of indigo, Prussian blue, gamboge, and ochre to make all sorts of greens. Indian yellow, light red, and some of the lakes give very beautiful tints. Before putting them upon the foolscap, mix the tints upon the back of a plate with a thin knife, a palette knife is the proper tool, and then spread it upon the foolscap. Try the simple colors first.

Gather leaves that are full grown, not the tender ones which will smash when hit with the pad or rubbed hard. Then the leaves must lie flat. Some bulge between the veins, and when pressed fold upon themselves. Others have very wavy edges, and these lap over each other. A hawthorn leaf makes a good example to start with. Currant and gooseberry leaves are excellent. Sycamore leaves, while large, are beautifully shaped. A maple leaf is quite exquisitely lobed and does splendidly. Geranium leaves are often good, and their downy upper surface will teach you how to print hairy leaves.

To decorate the leaves of a book do not start in a haphazard way. Think first which are the best kinds of leaves to use, and the best places to put them in.

When the leaves are placed carefully down on the page to avoid smudging, put the upper paper down just as carefully, and rub firmly, but not so hard as with the cartridge paper. The oil-color will come off much more readily, so it must be put on more thinly. When all the leaves are done, draw in with your brush the stalks and stems to connect them together.

These leaf pictures are often used to decorate furniture. The white-wood tables, brackets, and stools that are sold for the purpose are usually planed and quite smooth. Rub them over with a fine sandpaper to roughen the surface, and brush it clear of wood-dust. Sketch the design out on a piece of paper, and test your leaves upon an odd piece of wood to learn the amount of color required upon the leaf. Then carefully dab your leaf, and place it so that you get a clear impression. Put on the upper paper and rub. You may press heavily, as the wood will take the color without spreading. When done, the whole must be varnished to protect the table and drawings.

A HANDFUL OF STRAW AND AN INDIAN

THE fierce-looking Indian shown in the picture is made almost entirely of straw; it is quite simple to make if the picture is closely studied as a copy.

Besides a bundle of straw, we need some odd pieces of narrow ribbon—the sort that is called baby ribbon—a piece of brightly-colored blanket, a twig, some thin wire, a piece of string, and two black beads.

First take a handful of straw—about 20 pieces should be enough—tie them together with the ribbon about two inches down to make the neck. We are going to make our Indian about six inches high; if you prefer to make him taller, of course it is quite easy to alter the measurements in proportion. Tie the straw again about two inches further down still for the waist. Now divide the bundle into two halves to form legs. Tie the straw again at the knees and finally at the bottom where the ankles come.

The feet are made of short lengths of straw, tied on at the ankle with ribbon.

Give the man a pair of arms, by fixing on each side five straws half-way between the neck and the waist, tie them half an inch from the bottom to form the wrist, and the ends will give the fingers, which can be reduced to natural lengths by the aid of a pair of scissors. If the arms are fixed on with fine wire, they will keep in position better than if ribbon or string is used.

Now we have still to make the head. With the loose pieces of straw at the top as a foundation, fix on with wire about eight short pieces of straw. Cut these in the manner shown in the picture, to form the face and back head decoration, which will look exactly like a Red Indian's feathers. Bind a few pieces of the upstanding straw right round the head to give it shape, and leave the remaining pieces to make more feathers. Then cut the short straws so that they will represent the forehead, nose, and chin respectively; thread the beads with wire, and fix them in the correct position for the eyes.

The blanket, of course, must be draped round the body and either secured with a couple of pins, or sewn with a needle and thread. Every boy knows how to make a bow out of a twig and a piece of string, and an arrow of straw, and with these our Indian is quite complete.

The straw Indian made as described.

WHAT TO DO IN CASES OF DROWNING

BEING A LESSON IN FIRST AID TO THE INJURED

ONE of the most important things for all First Aid students to know thoroughly is how to bring about artificial respiration—that is, how to make a person who has apparently stopped breathing breathe again. Unless we know this we cannot render useful service in cases of drowning, suffocation, or gas-poisoning.

There are five different methods of restoring the breathing of an insensible and apparently lifeless person, and they are known after the names of their inventors as Sylvester's, Laborde's, Howard's, Marshall Hall's, and Schäfer's methods. Each is good, and in certain cases has its own advantages, so that we ought certainly to know each of them.

Inspiration by Sylvester's Method.

SYLVESTER'S METHOD. Place the patient on his back on a flat surface, so that he is inclined upwards a little from the feet; raise and support the shoulders on a firm cushion or folded garment placed under the shoulder-blades, so that the head will fall well back, as shown in the first picture; remove all tight clothing from the neck and chest; bare the front of the body as far as the stomach; and cleanse the mouth and nostrils.

Now kneel at the patient's head, grasp the forearms first below the elbows, and draw the arms steadily upwards towards you, keeping them stretched out in that position, with the elbows touching the ground for about two seconds. The correct position is shown in the first picture. By this movement air is drawn into the patient's lungs.

Expiration by Sylvester's Method.

Still grasping the arms, push them back, firmly upon the chest, pressing them on each side of the breast-bone, as illustrated in the second picture. The effect of this movement is to expel the air from the lungs of the patient. After two seconds repeat the same movements, and keep on doing so, causing the patient alternately to inspire and expire the air, about fifteen times in a minute at least. If there are two persons present to render first aid, while one is restoring breathing in the way described, the other should open the patient's mouth, draw forward the tongue, and keep it projecting beyond the lips as far as possible. He should also, if possible, excite the patient's nostrils with smelling-salts or snuff, or tickle his throat with a feather. It is also a good thing to flick the chest with a wet towel or else to rub it vigorously with a dry flannel.

LABORDE'S METHOD. Sometimes, owing to broken ribs, for instance, Sylvester's method cannot be followed. In that case Laborde's method should be tried. The patient is placed on his back or side, the lips and mouth are cleansed, and the tongue is seized and pulled forward as far as possible, being held in that position for two seconds. Then it is released. The operation is repeated about fifteen times every minute, and it will be found advisable to hold the tongue with a pocket handkerchief, as this will prevent it slipping from the fingers. Laborde's method is generally used in the case of children suffering from suffocation.

HOWARD'S METHOD. The patient is placed face downwards, his chest being supported on a firm cushion or rolled-up garment, and his head resting down on his hand so as to allow the water to run out of the mouth. We then press in upon the patient's back three or four times every few seconds to press the water out of the lungs.

Then, when the water is out, we rapidly turn the patient over with his face upwards, the rolled-up garment being placed just below his shoulder-blades. His head hangs down, and his hands are placed above his head. Now we kneel down, with the patient's hips between our knees, and, fixing our elbows against our hips, we seize the lower portion of the patient's chest, and with all our weight and strength press gradually forward for three seconds, until our mouth is almost over the patient's face. Then, with a push, we suddenly jerk ourselves back upon our knees. After a rest of approximately three seconds, we do this over again, and then repeat the movement about ten times a minute, until the patient breathes naturally. In trying to restore respiration we should persevere for at least an hour, as it may take quite as long as that before we see any result, and when natural breathing begins, we should not interrupt the natural breaths, but should continue our movements in between. Howard's method of artificial respiration can be combined with Sylvester's, the two movements keeping time with one another. Very often we shall have the great satisfaction of seeing our efforts meet with success.

MARSHALL HALL'S METHOD. The patient is placed on the ground, with his face downwards and the forehead resting on one of his forearms. After a few seconds he is raised slightly while a folded garment is placed for support under the chest. To restore breathing we turn the body gently on the side, and then quickly turn it back on the face again, repeating the movement fifteen times in a minute.

Then we turn on the other side, and back on the face in the same way, doing this fifteen times in a minute, and so we go on repeating till breathing is restored. Each time that the body is turned back on the face, we press firmly and evenly, with the hands one each side of the patient's back, between and below the shoulder-blades, stopping the pressure before turning the patient on to his side again.

Two persons are needed for Marshall Hall's method, as one must attend to the patient's head and arm while he is being turned backwards and forwards. When he is lying on his face, it is important that his forehead must always rest on his forearm. The explanation of the method is quite simple. When on his chest, the whole weight of the patient's body forces the air out, but when he is turned on his side the pressure is removed, and the air can enter the lungs.

Schäfer's method of restoring breathing.

SCHÄFER'S METHOD. We lay the patient face downwards, but it is necessary that the head be turned to one side to leave the nose and mouth perfectly free. No pad is placed under him. Kneeling at one side, in the position shown in the picture on this page, we place the palms of our hands on his lower ribs, with the thumbs nearly touching each other, and then, leaning forward, we press firmly, though not very heavily, straight down upon the back and lower part of the chest. This movement drives out the air, producing expiration. Then, drawing back our body rather rapidly, we relax the pressure without removing our hands, and inspiration is consequently produced. This process we continue for some considerable time, repeating the movements at the rate of about fifteen to the minute.

Whichever of the five methods we adopt, we must, of course, continue the various movements described until natural breathing is restored.

In cases of drowning it is best to loosen the clothing, clear the mouth and throat of the patient, and then apply the Marshall Hall method. As soon as we see that the air-passages are free from water, Sylvester's method should be used, and if there are two or more skilled helpers it should be combined with Howard's method, as has already been explained.

While breathing is thus being restored, someone should go for blankets and hot-water bottles, and also for a doctor. When the method used is successful in restoring natural breathing, the patient should be wrapped in dry blankets, and the limbs should be rubbed briskly towards the heart to restore the circulation of the blood. Hot flannels, and hot-water bottles or hot bricks should also be applied to the body.

As soon as the patient can swallow, a little hot tea or coffee or beef-tea should be given, and he should then be put to bed, kept warm, and encouraged to sleep. If there is difficulty in breathing, hot poultices or fomentations or mustard-plasters should be placed on the chest and between the shoulders. The patient should be looked after carefully for a time, and should there be any stoppage of the natural breathing, artificial respiration must be repeated without any delay until the breathing is restored.

Of course it cannot be emphasized too greatly that in cases of apparent drowning the process of restoring breathing by artificial methods must be applied without a moment's delay. Whether the patient be in a boat or on shore, he should simply have such clothes loosened or removed as confine the chest or hamper and interfere with the breathing. Coats and overcoats should, of course, be taken off as rapidly as possible, and if a tight jersey or vest is worn it should be ripped down the front to save time. The process cannot be too speedily applied, as a few moments' delay may make all the difference between life and death.

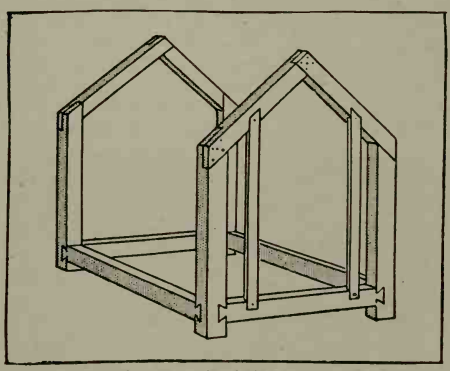
The method of restoring the breathing is the same for all cases of suffocation. For insensibility from electric shock Laborde's method is considered the best. In rendering aid to a person who receives an electric shock, we must first be very careful to insulate ourselves before touching the patient. We must further stand on some substance that is a bad conductor of electricity—such as india-rubber, or on a raincoat, dry silk or cloth, dry hay or straw, or dry glass or brick. To insulate our hands before touching the patient we can resort to the use of an indiarubber tobacco-pouch, or even a dry newspaper. In rescuing a suffocated person from a room full of smoke or gas, we should tie a wet handkerchief tightly over our nose and mouth, and we must crawl along, keeping as low as possible, near the ground.

If you learn thoroughly these instructions you may some day be of great assistance and perhaps be able to save the life of a fellow-being, perhaps one near and dear to you. There can be no doubt whatever that every year, in hundreds of cases, those given up for dead on account of drowning or suffocation might certainly have been brought back to life and restored to health if only someone present at the time of the accident had possessed the proper knowledge and had treated the cases immediately with the correct method.

MAKING A KENNEL FOR A DOG

THE size of the dog-kennel that we shall make will depend upon the size of the dog that is to occupy it. In making our kennel we must consider the comfort and health of the dog for whom it is to serve as a house and sleeping place. We shall assume that our kennel is to stand in the open air, in a corner of the garden, for instance. We must select a corner where it will not be too much exposed in bad weather, and where it will be sheltered from the cold and biting winds.

The kennel itself must be made so that it stands a little way off the ground, in order to keep the floor dry in wet weather, for dogs take cold as well as human beings, and love warmth and comfort almost as much as we do. Also we must provide ventilation so that there is always a current of air through the kennel. Then our dog's bed must be of a nature to make him comfortable. A piece of rug or carpet, or a little clean straw on the floor of the kennel, will do very well.



1. The framework of the dog's kennel.

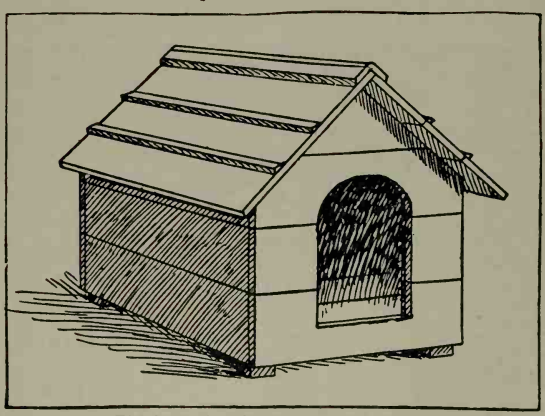
The length of the kennel inside should be half as long again as the dog when he stretches himself out, and the width inside should be wide enough to allow him to turn round without difficulty.

The first thing that we make is the frame of our kennel, which is shown in picture 1. The wood used should be two inches square. This is quite strong enough if we join it properly where the pieces meet. The picture will show us clearly how the wood is checked at the corners. Care should be taken to make the joins fit well, because it is upon this that the strength and the durability of the kennel will depend.

When we have made the frame, we may proceed to make the floor and walls. The floor-boards should be thick—not less than three-quarters of an inch—for thickness means warmth. They are laid across from side to side on top—not under—the long frame-pieces seen in picture 1, and nailed into position with good strong nails. Now we can put on the sides, made of wood running from front to back, as seen in picture 2. This wood should be not less than half an inch thick. It is important to have the edges of these boards smooth and straight, so that we can put the pieces tightly against each other without leaving a long crack through which a draught would come into the kennel and harm the dog.

The front and back must next be made and fitted. We make the back boards similar to those from which we made the sides, and nail them across. At the top we must saw the ends off so as to slope to the shape of the sloping frame that forms the end of the roof. Again, we must see that the boards are fitted tight up to each other, so as to leave no draught space. Now we are ready for the front. It is made exactly the same as the back, except that we must leave an opening with an arched top to form the doorway. The two extra upright pieces in the front of the kennel hold the short front boards at each side of the doorway. We can make the top of the doorway arch-shaped by first marking the rounded shape with a pencil, or by cutting out a paper pattern. Now we cut it out by following the marks with a key-hole saw, if we have one, and, if not, we can use our chisel to do the work.

We have still got the two sloping roof-sides to put on. The boards for the roof should be fairly heavy, and they should project about three inches over the front and back, and about two inches over each side, as seen in picture 2. This prevents the rain from running down from the roof on to the sides of the kennel. Finally, we put slips of wood, cut to the shape seen in picture 2, over each seam in the roof, so as to prevent the rain from finding its way into the kennel. The construction part of our kennel is finished; but we should bore five or six holes through the side walls under the projecting roofs, so as to provide the ventilation which is so necessary for the dog.



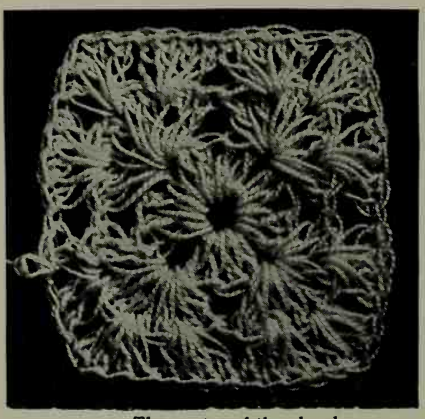
2. The kennel as it appears when finished.

We may paint the outside of the kennel with two coats of paint of any color we think suitable, waiting until the first coat is dry before applying the second, and we should give the inside a coat of lime-wash. A very good color for the outside of the kennel is dark green. This is a serviceable color and always looks well.

HOW TO CROCHET A SHAWL

THE square crocheted shawl described here is made of fingering, a fine soft wool like Shetland. Most people prefer it in white or grey, and as both wash well, we can take our choice. We shall need for a shawl of fair size about three-quarters of a pound of wool, obtainable at 10 cents an ounce, or $1.25 a pound. Coarser kinds can be bought for 5 and 6 cents an ounce. As it can also be bought by the skein, it is easy to get more if the original quantity proves insufficient.

The shawl will unavoidably get handled a good deal in the making, and as it would be a pity to spoil its freshness in any way, after a few rows are completed, the worker will find it a good plan to keep the shawl in a clean pillow-case while making it, the edge of the side which is actually being crocheted alone appearing through the opening in the case.



1. The centre of the shawl.

For crocheting wool, one of the five-cent black flexible crochet hooks will be found light and comfortable to work with. If this is our first attempt at this kind of fancy-work, we should turn to page 1364, where different kinds of crochet stitches are fully explained.

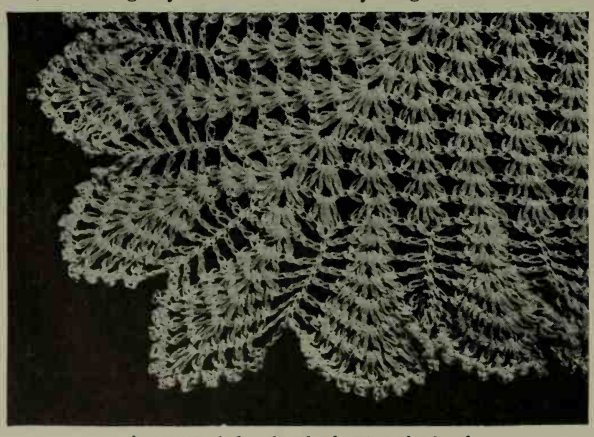
And now for the pattern of our shawl. The stitch is quite simple, for it consists only of chain, trebles, and a few doubles when we come to the border, combined in different ways. But one word of warning: let the treble stitch be long in the loop, and the whole loosely worked, for a tightly crocheted woolen shawl mats and gets hard in the wash. We start by making 6 chain, and join the ends to form a ring by drawing the wool through the first loop. Next we crochet 3 chain, which will in future mark the starting-place for a round; then we work 15 trebles into the ring, draw the wool through the 3rd stitch in the little chain of three, and thus complete our 1st round. To start the 2nd round, we make, as before, a chain of 3, then, passing by the chain below, we make 8 trebles between that chain, which really represents the first of 16 trebles, and the 1st treble we made. We now pass by 4 trebles below, and make 8 trebles into the space between the 4th and 5th trebles below. Passing by 4 more trebles, we again make 8 trebles, this time between the 8th and 9th trebles, and repeat this once more between the 12th and 13th trebles.

The groups of 8 trebles are the starting-points for the corners of the shawl, and it is from the centre of each 8 that we shall have to increase the stitches as we proceed. Now, if we look at what we have done, we begin to see the tiny centre of the shawl; and, even at this early stage, it is well to square it into form with the fingers. We join up to finish the round, and make 3 chain as before.

In the 3rd round we simply crochet 4 trebles between the 2nd and 3rd, the 4th and 5th, the 6th and 7th trebles of each of the 4 groups of 8 trebles. The result is seen in picture 1.

In the 4th round we do the same thing but there is one change. At each corner there are now 4 trebles—not 8, as in the previous round—and by working 8 trebles into the middle of the 4 we now increase the size.

In the 5th round we make 3 sets of 4 trebles at each corner, just as we did in the 3rd round. Thus *every alternate row has 8 trebles at a corner.* This point we must be very careful about, or we shall find the shawl getting out of shape and puckered; yet we shall become so accustomed to working 4 trebles that we may easily forget whether it is the turn for eights or fours. So look well to the corners.



2. A corner of the shawl, showing the border.

As the shawl progresses, we shall notice how far a skein of wool goes, and how large we shall be able to make the shawl with the wool at our disposal. A generous allowance must be left for the border, however, as this consists of seven rounds, the last with an edging, and the first three alike. They make the "shell pattern" as follows:

1ST ROUND—4 trebles between 2nd and 3rd trebles below, 2 chain, 1 double between 2nd and 3rd trebles below, 2 chain. Repeat to end.

2ND and 3RD ROUNDS—As above, but making double through double below.

4TH ROUND—1 treble between 1st and 2nd trebles, 4 trebles between 2nd and 3rd trebles, 1 treble between 3rd and 4th trebles, 2 chain, 1 double through the double below, 2 chain. Repeat to end.

If we look at picture 2, we see that from the 4th round of the border 1 extra treble is made each side of the scallop to enlarge it in this and succeeding rounds, and in this way the shell form is obtained. We therefore proceed in this way:

5TH ROUND—1 treble, 1 treble, 4 trebles, 1 treble, 1 treble, 2 chain, 1 double, 2 chain. Repeat to end.

6TH ROUND—1 treble, 1 treble, 1 treble, 4 trebles, 1 treble, 1 treble, 1 treble, 2 chain, 1 double, 2 chain. Repeat to end.

7TH ROUND—This needs care, for it has only 3 trebles at the point of the scallop, and an edging along it. We proceed in this way:

1 treble, 3 chain, 1 double into the last 2 loops of the treble just made. This forms the pointed edge seen in picture 2. 1 treble, 3 chain, 1 double, 1 treble, 3 chain, 1 double, 1 treble 3 chain, 1 double, 3 trebles, each with 3 chain, and 1 double for edge. The other side of the scallop is a repetition of the first. Then we proceed as in previous rounds —2 chain, 1 double, 2 chain.

The corners of the border should offer no difficulty, the scallops being worked exactly as they come, whether one happens to fall just at the corner or not.

WHAT ARE THESE PLANTS?

A BOTANICAL PUZZLE GAME FOR BOYS AND GIRLS

HERE we have a plant puzzle game in which six plants are correctly described to us, and from these descriptions we should at once be able to name the plants. The right names are given upon page 5354.

1. On the southern shore of England, where the tide washes over it every day, among rocks and shells, there lived a little brown plant. It had a root and branches that were tough, quite unlike the hard woody twigs of a tree. It would have liked to grow pretty flowers, but it could not manage that, so it gazed instead at the lovely sea-anemones that lived on a rock opposite. All its life it had dwelt in the same little crevice of a rock. In the hot summer days it used to get flabby and limp in the blaze of the sun, and it thirsted for the cool refreshing water to revive it. When the tide came up, it pushed up its branches and waved them in sheer pleasure. A branch once floated on to the sand and lay there till a little boy came along. He picked it up, and "Pop, pop, pop!" it went as he pressed it between his thumb and fingers. What was the plant called?

2. There is a very strange plant growing in a meadow, so strange that one might think it a magic plant. It chooses a funny time to do all its growing, for it grows up in a night. It is a pale white thing, and we have to search quite underneath it near the stem to find any color. There are rich brown plates under the white cap, all placed evenly side by side like the spokes of a wheel. We gather it and eat it for dinner with beef-steak. What is it?

3. There is a trailing wild plant, a native of Europe and Asia, but found also in the United States, which is named from the taste of its root and branches. The name is a contradiction. It is a member of the potato family, and has a typical potato blossom, but its leaves are unwholesome to eat. It is found in thickets and in moist places, and sometimes climbs over walls and bushes, or twines itself round other plants. Its oval berries, at first bright green, when fully ripe become brilliant scarlet, resembling red currants. These are the ripe seed-vessels of flowers which have withered. There is a picture of the plant in THE BOOK OF NATURE in Volume XIV. Can you guess what it is?

4. Someone gave a brother and sister a slightly flattened, round, brown thing, dry and hard, which reminded them of an onion. The friend who gave it them asked for a bowl, put some pieces of charcoal in the bottom, then some cocoanut fibre mixed up with broken shell, and buried the dry brown thing in it. "Keep it wet, and put it away in the dark," the children were told. So every day they had a look at the bowl, until at last a light green point began to show through the brown coat. Then they were sure it was a plant, and brought it out into the light and put it in the window for the sun to help it grow nice green leaves. When it was still quite young it sent up a flower-stalk, and as the days went by the buds opened out into beautiful bell-like pink flowers, so sweet-scented that their fragrance filled the room. What was the name of this plant?

5. Millions and millions of just one kind of plant! It takes hours and hours to pass them in the train, and our eyes get dazzled with the golden color. What a wonderful plant! Let us take home a seed, and put it in some damp sand. Six days later it will have grown a little hairy root downwards and two more are just appearing beside it. Upwards into the air it will send a shoot, and about ten days later a leaf will have grown out of this. All the early summer it goes on getting taller. Then it puts forth flowers, though we should hardly know them for such. These produce seeds, and how precious these seeds are! Without them we should go hungry, for they are our daily food. What is the plant?

6. On one of the sunny isles of the South Sea is a very tall plant. Its pretty, feathery-looking leaves all grow at the top. Every year it has been growing nice things that are really seeds, sometimes two hundred of them, for the children all over the world, things they like to eat and drink, and make into sweets, cakes, and biscuits, and sometimes use for making soap and even for oil for lamps. They are all wrapped round with thick brown coats that are made into matting, mats, and baskets. What is the plant's name?

SIMPLE TRICKS FOR ODD MOMENTS

THERE are many simple tricks that may be performed with little or no apparatus that cause a great deal of fun and amusement at any gathering of our friends.

For instance, we announce that we can place a glass of water upon the table, cover it with a hat, and then drink the water without removing the hat. This sounds an impossible task, and everyone is anxious to see the trick performed.

It is done in this way. We stand a glass of water on any ordinary table, borrow a hat and place it over the glass. While doing this we talk and emphasize the wonder of the trick we propose to show our audience, and we say that on no account must anyone touch the hat.

Then we go under the table and make a pretence of drinking the water through the wooden table. Everyone is, of course, sceptical, and, after coming from under the table, we ask one of the audience to remove the hat to see if the water has been drunk or not. As soon as this is done, we seize the glass and drink the water, and then announce to our surprised audience that we have done what we promised to do—namely, to drink the water without removing the hat, someone else having removed the hat for us.

Another simple trick is to take two cents from our pocket, and then ask if anyone in the audience will lend us a cent. Of course, someone immediately does so, and we now have three cents. Placing the cents down on the table one after the other, we count them as we do so, saying:

"One, two, three—that makes four cents."

"No, three cents," says the one who lent the cent.

"One, two, three—that makes four cents," we repeat, as we count out the three cents again, and regard our friend with a surprised look.

Our friend insists once again that we have three cents only, and then we exclaim:

"Well, can I keep the cent if I am wrong?"

In nine cases out of ten the answer that will be given will undoubtedly be "Yes."

"Well, I *am* wrong, so I keep the cent," we reply, and our friend then realizes that he has been tricked, while the audience laughs heartily. We should practise this before trying it at a party, for the success of the trick depends upon there being no hesitation in the counting.

There is another simple trick which usually mystifies an audience and creates much interest. We undertake to pick a marked penny out of a hat without seeing it. First of all we borrow a hat, and then ask three or four members of the audience to put a penny each into the hat. We next cover this with a pocket-handkerchief, and talk for a minute or two to allow the coins to become perfectly cool.

Now we ask any member of the audience to take one of the coins from the hat and put a mark upon it, after which he is to return it to the hat and cover the whole with the handkerchief again.

Then comes the climax of the trick. Approaching the hat without looking at it, we talk of the wonders of magnetism, and, putting our hand under the handkerchief into the hat, extract the marked coin, to the astonishment of all beholders.

The explanation is as follows: In marking the penny, the member of the audience handled it for some few seconds, and the heat of his hand was communicated to the penny. When we feel the coins in the hat, the warmth of the one that has been handled is quite perceptible, and we are able to identify and to bring it triumphantly from the hat.

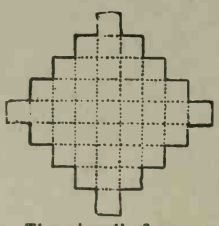
To be still more certain that the penny selected and marked shall be warm, we can ask the one who marked it to hand it round among the other members of the audience, so that they may all examine it thoroughly and be able to recognize it again when they see it. This adds to the importance of the trick and creates greater interest, besides ensuring success.

Simple tricks like this that cost nothing at all for apparatus, and that require very little skill to perform, often give the greatest amount of pleasure to those who see them.

THE PUZZLE OF THE MYSTERIOUS SQUARE

ONE afternoon Kenneth could not go out as it was wet, so he went into his father's library and began to look at some of the books. After a little while he came across a book of Eastern tales, and in it he found many interesting problems that the wizards of the East had invented to amuse their royal masters and their friends.

One of these problems he could not solve, however much he tried. He puzzled and puzzled over it for a long time, but all was useless. Picking up the book, he went and pushed open the study door and peeped into the room. Seeing that his father was not very busy, Kenneth went in and asked if he would show him how to do the puzzle.



The wizard's figure.

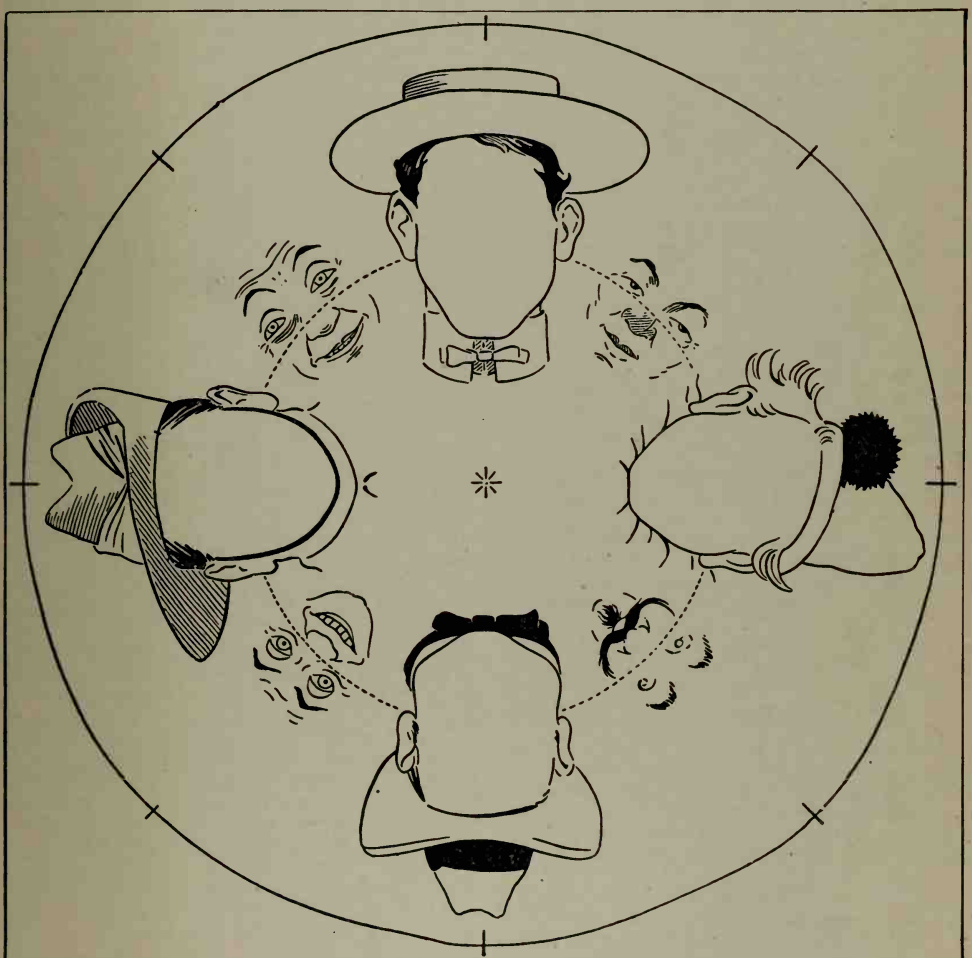
In the book that Kenneth gave to his father was a drawing exactly like that shown here, and the puzzle was to cut this figure into four pieces, by means of two straight cuts, so that the four pieces, when put together in a certain way, would form a perfect square.

"Why, it is quite simple," said his father, with a laugh, after looking at it for a short time. "Take it away, Kenneth, and try again to do it yourself, and if you do it by to-morrow morning I will give you a book as a reward." Kenneth tried very hard, and at last he solved the puzzle quite correctly. How did the boy cut the figure and put the pieces together? The solution is on page 5354.

HOW TO DRAW HUNDREDS OF FACES

WITH the diagram on this page we can draw hundreds of different pictures, even though we may not be artists in any sense of the word. First of all, we should take a piece of good tracing-paper and trace the diagram upon it quite carefully and accurately. Then we should ink over the lines, and when the ink is quite dry paste the tracing-paper with the design upon a piece of cardboard. To do this, cover the card with a smooth paste and lay the tracing-paper upon it, smoothing out all wrinkles with a clean cloth. When this is dry, we are ready to draw any number of faces. Take a piece of tracing-paper and pin it down upon the card, pressing the pin through the centre of the diagram where a star is marked. Now we must trace any one of the hats upon the transparent paper. Then let us turn the paper round until the hat that we have drawn comes over one of the other hats in the diagram. Now trace the shape of the face that appears under our hat. Again turn the tracing-paper round until one of the pairs of eyes comes into position within the outline of a face that we have drawn. Trace the eyes with pencil, and finally turn the paper round to another position and trace a nose and mouth. We now have a complete face with eyes, nose and mouth, hair, and hat.

By ringing the changes and drawing the different eyes in the different face outlines, and putting sometimes one hat or mouth and sometimes another, we are able to make hundreds of different pictures. There are one or two things to remember if we want to be successful in thus producing an imaginary portrait gallery. The tracing-paper must be pinned down firmly upon the card and must not be allowed to shift about, or the different parts of the different faces will not join up properly. Then we should use a soft black lead pencil in tracing the faces, and we must not press too heavily or we shall indent the card and spoil the diagram. We can ink over the pencil-lines afterwards.



BY FOLLOWING THE DIRECTIONS, WE CAN, FROM THIS DIAGRAM, DRAW HUNDREDS OF FACES

GAMES TO PLAY WITH MARBLES

RING-TAW

A CIRCLE of about a foot wide is drawn on a piece of smooth ground, and in it is placed a number of marbles, one or two from each player. Outside and around this, some six feet away, another circle is drawn. The beginner then kneels, with his hand against this outer line, and shoots his playing marble, or "taw," at the group placed in the central ring.

This is done by pinching the taw between the knuckle of the bent thumb and the curve of the forefinger, and suddenly straightening the thumb. If he knocks any out they are his, and he may aim again from the spot at which his taw has stopped. If, however, he misses, and his taw remains within either of the rings, he must leave it there, in case the next player wishes to shoot at it. If hit, the owner of the taw must hand over one marble, but no taw can be taken, and it can be aimed at only once. The game continues in this way till all the marbles are knocked out of the ring.

OVAL RING-TAW

THIS is another, though more unusual, way of playing ring-taw. Instead of a circle, a large oval, about three feet long and two feet wide, is drawn. At each end of this a small space is marked off by a straight line from side to side of the oval, and midway between these two spaces a small cross is made. On this mark a marble is placed, and one in each of the end spaces. A straight line, as long as the oval is wide, is scratched on the ground, at a distance of four feet from the end of the oval, and from this line the taws are shot by the players.

The player may shoot from any part of the line, and should choose a position that gives the best chance of hitting one of the three marbles. It is a common practice to "lay up,"—that is, to shoot the taw with little force, so that it rolls into the ring and makes the next aim easier. But, as each player shoots in turn, this puts the taw in danger; yet boys are willing to run the risk of having their taws knocked out by others, rather than shoot them through the ring time after time without hitting anything. Though in this game there are fewer marbles to aim at, it is more exciting and interesting than ring-taw.

PITCHSTONE

TWO players with two marbles play this game. One boy throws his marble down. If his companion can hit it with his own, he wins ten marks, and has the right to try again, aiming from the spot at which his marble stops. He may keep on till he misses, when the other player takes a turn. A certain number should be fixed upon—say, one hundred—and the player whose marks reach this first will be the winner. Sometimes this game is played with smooth pebbles.

PICKING PLUMS

AFTER drawing a long, straight line, each player places upon it one or more marbles, all separated from each other by an inch or two. Then another line is drawn at a distance of eight feet, and each player takes his turn to shoot once at the "plums." Those he knocks out he is supposed to keep as his own; every time he misses he gives up a marble.

PYRAMIDS

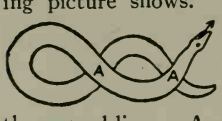
THE pyramid is made by one of the players placing several of his marbles close together in a group and others on the top of them. Round this pyramid a little circle is drawn. He then agrees that any of the other players may "shoot" at it by paying him one marble for every shot. If the aim is successful, the marbles that roll out of the ring belong to the boy who knocked down the pyramid. It has to be built up again for the next "customer." Of course, the owner makes his profit out of those who aim without hitting, which very often happens.

WALL MARBLES

TWO players take their stand opposite a wall, against which one of them tosses a marble. When it has rebounded and rolled along the ground, the second player follows suit with one of his own marbles, trying to throw it in such a way that in rolling back it shall strike the first marble. If successful, he takes up the one so hit as a prize, but leaves the marble he threw where it lies. Under no other circumstance must a marble be picked up until all the marbles of each player have been thrown. Then those lying farthest from the wall may be taken up in turn and tossed against the wall. It requires skill and judgment to play this game.

THE SERPENT

THIS is a game that French boys play. The outline of a serpent is drawn on the ground, with two coils, as the accompanying picture shows. The eye of the serpent is a small hole made in the ground. The players start from the tail, and in turn shoot their taws along between the curved lines. Any who send their marbles outside these lines, or allow them to pause at either of the two points marked A A, must go back to the tail. Also, he whose marble is struck by that of another while on the journey to the head must begin again. The boy who first reaches the eye, and rolls his taw into the hole, is counted the winner.



STAND-UP MEGS

TO play this game we make or draw a two-foot ring about eight inches from a fence or wall. A line is drawn about seven feet long from the centre of the ring, and another line is drawn across the end of this, at which the players take their stand. Any number may play, but from three to six players provide the best game. A large alley is placed in the centre of the circle, and the players take it in turns, in a standing position, to shy at the alley with a taw. If the player misses he pays a marble to each of the other players, and if he hits the alley he receives a marble from each and goes on shooting until he misses, when it is the next player's turn.

KEEPING TORTOISES AS PETS

A TORTOISE needs less attention than any other pet that we can choose. Indeed, during the winter a tortoise needs no attention at all, for it goes away into a corner of the garden, and sleeps until the coming of spring.

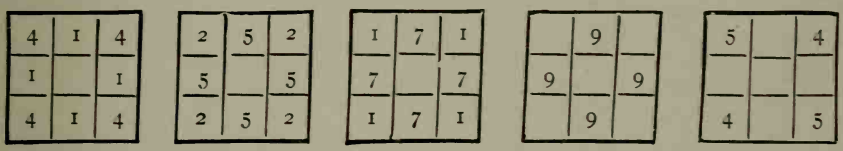
Tortoises can be bought for about a quarter each, and the best way to keep them is simply to put them in the garden and let them look after themselves. They may go out of sight for days, or even weeks, and we may think them lost, but they will generally turn up again.

It is supposed that tortoises are very stupid creatures, but they have been known to walk out of a flower-bed at the call of their owner, and although this is about the limit of their intelligence, it proves that they are responsive in some measure to attentions paid to them.

When we take a tortoise into the house, especially if it be hungry, we shall find no difficulty in persuading it to eat green food, such as lettuce and cabbage, and it may even be tempted to take some bread and milk.

SOLUTION OF THE GUARD'S PUZZLE ON PAGE 5031

THE guard at the king's hunting lodge was able so to arrange its numbers every night that there were always 9 soldiers on each side of the king's chamber. On the first night, when 4 soldiers went to the village, leaving only 20 behind, these disposed themselves as in the first diagram. On the second night, when 4 friends of the troopers came to the lodge, and there were thus 28 instead of 24 men present, they were distributed as in the second diagram. The third night 8 visitors entered the lodge, and these, with the 24 soldiers made a total of 32 men to be arranged, so that 9, and only 9, should appear on each side of the house. They did so in the manner shown in the third diagram. On the fourth night, when 12 friends visited the lodge, the men distributed themselves as in the fourth diagram. Finally, on the fifth night, when 6 of the soldiers went to the village, leaving only 18 of their number behind, these 18 arranged themselves as shown in the fifth diagram. It will be seen that in every case, no matter whether there were fewer or more than their correct number present, they were always able to arrange their guard so that the king's order of nine men on each side was obeyed.



SOLUTIONS OF THE PUZZLE PICTURES ON PAGE 5036

ON page 5036 are ten sets of puzzle pictures, each set representing the name of a well-known plant. By putting together the names of the various objects that are shown in the pictures, we can discover what are the plants represented by the artist. The correct answers to the puzzles are as follows: 1, Cabbage; 2, Cauliflower; 3, Larkspur; 4, Apricot; 5, Orchids; 6, Hollyhocks; 7, Box; 8, Foxgloves; 9, Heartsease; 10, Gooseberries.

SOLUTIONS OF THE ANAGRAMS ON PAGE 5037

AT the end of page 5037, which gives a description of what an anagram is, and tells how anagrams may be formed, a number of words and phrases are given from which good anagrams can be made. The following are the solutions of these anagram puzzles, although it must be distinctly understood that these are not necessarily the only solutions: Catalogues will give: Got as a clue; Christianity gives: I cry that I sin; from Crocodile we get: Cool'd rice; and from Lawyers: Sly ware. Melodrama provides: Made moral; and from Midshipman comes: Mind his map; Parishioners will give: I hire parsons; Presbyterian gives: Best in prayer; and from Soldiers we have: Lo! I dress.

Some words are given on page 5037 in which the article before them is to be used in the anagram. The calceolaria gives: Eat coal, Charlie; The nightingale will make: High gale in tent; and from The turtle-dove we get: Eve, let truth do. The phrase Is pity love? provides, in reply to the question, the anagram: Positively; and from Poor house we have: O sour hope, which most will agree is a very appropriate anagram according to the popular idea of the poor house.

The following is the list of names given on page 5037, with its anagram after each: John Abernethy, Johnny the bear; Thomas Carlyle, Cry shame to all; Charles James Stuart, Charles, a just master; Henry Wadsworth Longfellow, Won half the New World's glory; Alfred Tennyson—Poet Laureate, Neat sonnet or deep tearful lay; Sir Robert Peel, Terrible prose; William Shakespeare, I ask me has Will a peer; Robert Southey, Robust hero yet; George Thompson, O go! the negro's M.P. Thomas Carlyle gives several other anagrams in addition to the one mentioned above. We have from the letters composing the great thinker's name the following: Mercy, lash a lot; A lot cry "Lash me"; A calm, holy rest; Clearly to sham. The examples given will show that the mental exercise obtained in thinking out anagrams is by no means trifli...

THE NEXT THINGS TO MAKE AND THINGS TO DO ARE ON PAGE 5247.

AN OBJECT LESSON IN FRENCH

This bird's-eye view gives the French words for the many objects. The French name is printed against the object it describes. Reading from left to right downwards, we have the French words for the sky, the clouds, the rays of the sun, a mountain, the sun, a volcano, the hills, a wood, a lake, the river-bank, a forest, the town, the park, the iron bridge, an avenue, a village, the railway station, the stone bridge, the high street, a windmill, the railway, a tunnel, the tug-boat, the embankment, the express train, a field, the marshes, a barge, a wharf, a factory, the cornstacks, a cornfield, the farm, the river, a wagon, a road, the bandstand, the hotel, the cliffs, a cave, the coast, the sands, an island, a cruiser, the pier, a lighthouse, the mouth of the river, the rocks, a wreck, a yacht, a buoy, a steamer, a sailing ship, a motor-boat, and the sea.

WHAT THIS STORY TELLS US

FEW of our modern inventions give more pleasure than the moving pictures, which almost every child has seen. We learn below how the pictures, thousands of them, are made on a little strip of film and then are magnified as they are thrown upon the screen. How all this came to pass is a long story, and the steps have taken many years. The moving picture business, unknown a few years ago, now employs the service of thousands of men, women and children, and many animals, and affords amusement and instruction to millions. A single reel which is shown in twenty minutes or less contains about 16,000 separate pictures, only an inch long and less than an inch high.

MAKING MOVING PICTURES

CONTINUED FROM 5078

YOU all know what moving pictures are. You think you know all about them, for you have been to the big halls or theatres where wonderful pictures of all sorts are flashed upon the big white screen on the stage, and where people and animals as large as the real ones, move quickly before your eyes almost as if they were alive. You all like the "movies," as they are sometimes called, but perhaps only a few of you ever think how the wonderful pictures are made.

It seems very strange to think that a strip of little pictures three-fourths of an inch high and an inch wide can be flashed on a screen making the people and animals and other objects it shows as large as life. Perhaps you wonder that a camera, little pictures no bigger than postage stamps, and an apparatus called a projecting machine can do this wonderful thing; but it is just the combination of these three things that makes it possible.

SIX HOURS ONCE REQUIRED TO TAKE A PICTURE

You see, a long time ago, up to about 1839, in fact, no one knew much about taking pictures. The art of photography was just beginning to be understood, though no one had then tried to do more than take a picture of an object standing perfectly still. Up to that time, to get a faint picture of such a simple thing as a tree in the garden, a time exposure of six hours had to be made before the plate in the camera would record an impression. Those of you who have cameras of your own will appreciate this, for it seems hard to believe now, when an excellent picture of almost anything can be made by an exposure of a very small part of a second.

In 1839 two men, Daguerre, a Frenchman, and Talbot, an Englishman, who had been studying the making of pictures, with the idea of making them better, announced that it was possible to do wonderful things with a camera, and that a picture could be made in a few minutes. The first picture of a person was made in New York City by Professor John W. Draper. Almost immediately other experimenters were able to shorten the time to seconds.

SNAPSHOTS IN LESS THAN A SECOND OF TIME

To take a picture in a few seconds! That seemed a wonderful thing to the photographers of those early days. The time exposure had been reduced from six hours or 21,000 seconds to a few seconds — three or four — and then the effort was to reduce the time still further, as well as to make plates easier to handle.

In the end, it was a chemist who found the way. He experimented in his laboratory until he produced a plate so sensitive to light that it would take a picture "clear, distinct and full of detail," in an instant, better than the one which had taken an exposure

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20,000 times as long. Now, any one with a camera and this new kind of plate could take a picture of a horse jumping, a bird flying or a man walking along the street so quickly that you could hardly know it was being done.

HOW HORSES TOOK THEIR OWN PICTURES

Then certain other men began to study this new way of taking pictures, and they said that if it were possible to take a picture of a horse jumping a fence or a bird alighting on a tree, it was possible to take pictures showing every motion made in any act. A man named Muybridge, living in San Francisco, California, was very much interested in this idea, and tried to see what he could do.

In 1877, or 1878, he built for himself a photographic studio near a famous racetrack, put up a big white screen a little distance away from it, and placed twenty-four cameras in a row, with twenty-four threads stretching across the track between the studio and the screen. Each of these threads was connected with a spring which held the shutter of a camera in place. When a horse, walking or galloping on the track, passed near each camera, it broke the thread holding the shutter, and released the spring, thus actually taking its own picture. The great French painter, Meissonier, was much interested in this odd manner of photographing a horse in motion, and did all he could to help make it a success. Several questions which had been in dispute were settled by these pictures.

A NEW KIND OF CAMERA IS INVENTED

However, other men who had been working on this same problem, thought that it was too troublesome to have to use twenty-four cameras in taking pictures of objects in motion, and they decided to experiment in taking pictures with one. They found almost as many difficulties as the earlier inventors had found, for they wanted to make the method as simple as possible, and yet gain the greatest results. They had the right idea, but there were many obstacles in the way of their carrying it out. Not only did the chemist have to invent a new sort of plate easier to handle, but the mechanical engineer, the optical instrument maker, and the lens maker had to plan how they could make this special kind of a camera which was to take dozens of pictures, one right after the other, with only the smallest space of time exposure between.

THE CELLULOID FILM SOLVES THE PROBLEM

It was the chemist who found the way again. But about this time (1888) roller photography, in which a length of prepared paper wound upon a roller is used instead of a plate, was introduced by Mr. George Eastman of Rochester, New York, and to meet the demands of this new sort of photography, a transparent base or support which should take the place of the glass plate had to be found. It was a difficult task, and Mr. Eastman worked on it for four years. Then one day a chemist happened to show him a thick solution of gun-cotton in wood alcohol. The appearance of the mixture caught Mr. Eastman's eye, and he commenced to try some experiments with it. A clergyman, Reverend Hannibal Goodwin, was also working upon this idea, and, indeed, seems to have succeeded first.

The solution could be made as transparent as glass, and by careful chemical treatment could be reduced to a liquid something like extracted honey. In making the celluloid film, this mixture was poured upon polished supports, where it spread out in a thin film, and was allowed to dry. The thin coating of transparent, flexible material was then stripped from the supports, coated with a sensitive mixture and permitted to become dry and hard. It was then cut into sheets about three and a half feet wide, and then into strips of film. Then began the great craze for "Kodaks," as the first cameras using this film wound upon spools were called.

THOMAS A. EDISON TAKES THE NEXT STEP

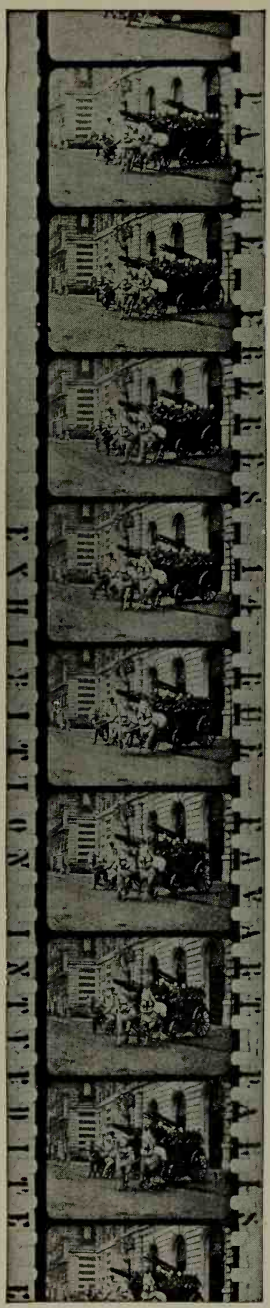
In 1893, Thomas A. Edison patented the kinetoscope. The film was used in a box, but the light behind was not strong, and to see the picture, one looked through an opening in the box. Only one person at a time could see the picture, and the machines were seen chiefly in public places beside slot machines. No one paid very much attention to them.

Finally an Englishman got the idea of throwing the picture on a screen so that many could see it at the same time. With the help of the new film they succeeded, and were now able to secure a long strip of pictures following each other

in proper order, and these pictures were taken at such short intervals, that, when thrown upon a screen and passed swiftly before the eyes, they produced the effect of motion. So the name "moving pictures" was born.

Each of these little film pictures is a little less than an inch wide and is three-quarters of an inch high. It takes dozens of them to show a hand being raised to scratch a nose. In each of the "single reel" pictures you see at the "movies" there are about a thousand feet of film. Each foot contains sixteen of these tiny pictures which flash so rapidly on the screen that, in ess than twenty minutes, sixteen thousand pictures pass before your eyes. Every picture remains on the screen a little more than one thirty-second part of a second, and between every picture there is less than one thirty-second part of a second of darkness. Therefore, before the impression of one picture is gone, an-another takes its place.

However, we do not realize that the picture has changed, for an impression made on our eyes remains for about two forty-fifths of a second after the object which made the impression is gone. This is what the wise men call "persistence of vision." When a powerful light is thrown on the little strip of film, which has been made very sensitive to light, a lens in front of the big projecting machine, which is what flashes the pictures on the screen, greatly magnifies the picture. This makes people, animals and objects as natural as in life.



Here is a bit of film, exact size, containing eight pictures and made in the short space of a half second.

NO MOTION IN "MOVING" PICTURES

Suppose a picture thrown on the screen shows a man walking along the street. To get this simple action, dozens of little pictures are taken. The first may show the man with his left foot in the air. The next picture shows the man with his left foot perhaps an inch lower, the next with his foot an inch lower still, and so on, until you see a picture of the man with his left foot on the ground. All these pictures have followed each other on the screen so swiftly that you believe the man has just placed his foot on the ground. *But moving pictures are not really motion at all.* All that happens is that a long string of snap-shot pictures, shown at intervals of less than one thirty-second part of a second, are thrown on the screen and pass with great speed before your eyes.

Now, if these pictures were thrown on the screen only at the rate of one per second, they would be like those of an ordinary magic lantern; but as the moving picture operator turns the crank of his machine faster and faster, the figures in the pictures begin to jerk their limbs this way and that, just as if some one were pulling them by strings. When the operator gets just the right speed, the figures lose their dancing, jerky motion, and walk and act as people do in real life.

Pictures taken of things in motion, are really taken when the object is holding itself still. Suppose you see a horse in the act of jumping over a fence. Although every muscle in his body seems to be in action, and looks so in the picture thrown on the screen, the picture is really taken at the instant of time when he is perfectly still in the air right over the top of the fence. It is the same when he appears to be trotting. The picture showing the motion, is taken when one or

more of his feet are at one of two resting points—either just before the beginning of the movement, or at the final point, just after the movement has been made.

How the moving picture plays are made

The first step in the making of a moving picture play is to choose the plot or "story" which is to be acted. Outlines of plots, which are called scenarios, are sent in by outside people, or some one in the editorial rooms of the moving picture company may write them. Every moving picture company has its own actors and actresses, one or more stage directors, its property men, its electricians, carpenters and stage hands. Some of these actors and actresses have names which are very familiar to you. You have seen many of them on the picture screen and have learned to know when your favorite character or actor appears. Some of the most famous actors and actresses in the world have appeared before the moving picture camera. Even the famous French actress, Sarah Bernhardt, has acted before the machine in several plays.

After the plot has been decided on, the director of the company gives the different members their parts. Every one needs to be skilful in the art of "making up," for a young man may enact the part of a gray-headed father, a young woman the part of a witch and a young girl the part of a little child. When the different parts or roles are given out, the property man picks out the right furniture and costumes from his immense room, in which are stored sometimes several thousand costumes, and which looks like a junk shop containing everything from a pair of Cinderella's slippers to an emperor's robes; the carpenters busy themselves building houses, interiors and shops as settings for the different scenes, and the electricians look after their powerful lights, for indoor pictures are taken by artificial light.

How the pictures themselves are made

If the picture is an indoor one it is taken in what is called a studio—a big, barn-like room where actors and actresses, dogs and horses, trained mules and tame snakes, animals and stage furniture crowd together in great confusion. The director explains what is to be done, and when all is ready for the rehearsal of the first scene, watch in hand, he takes his stand beside the camera. "Go!" he calls, and the actors begin to act, the director watching them as a cat watches a mouse. "Lively there," he calls to a man whose part demands that he shall fall off a chair. "Don't slide down. Fall—fall hard!" And to the big comedian in front who has to furnish the fun, he shouts, "Now laugh; laugh as if you meant it. Laugh hard!" To the excited woman who wants to make trouble for everybody in the picture, he says, "Look crosser. Wave your arms. Get excited. Shake your fist. Good! That's the idea!" And so, even showing them himself how it should be done, he gets his actors to the point of excellence where the picture is ready to be taken. Often many hours are devoted to rehearsal before the director is satified. Then he calls "Camera!" and the camera operator in the foreground begins to turn his crank.

The moving picture camera, which takes the picture

The camera has three chief parts. Two square compartments in the back hold the film boxes—one containing the unexposed, the other the exposed film. The camera works on the principle of roller photography. It has a large lens in its front part and a screw for focusing the picture. The film, coming from the unexposed film box through a narrow slit, passes under a small guide roller, then upward over a second roller, and down again under a sprocket wheel. Each film picture has four tiny holes on each side, and the teeth of this sprocket wheel exactly fit into these little holes, and serve to guide the film forward. The film now passes upward from the sprocket wheel, and is kept in place by another guide roller which presses lightly upon the film to keep it in contact with the wheel. Now the film passes behind the lens for exposure, during which instant the picture is taken, and then passes downward and goes into the lower film box, where it is wound on a bobbin or reel.

How the Cooper Hewitt lights help

These indoor studios are fitted with the most powerful lights imaginable, and some of them have great stands of lights on or near the stage which look like huge toast racks. These are known as Cooper Hewitt lights, and are really long glass tubes containing mercury, and from which the air has

MAKING MOVING PICTURES INDOORS

Here is the property room of a large motion picture company with its thousands of costumes, as well as weapons, helmets and armor. Here you see costumes for priests, peasants, courtiers and soldiers, in such numbers that the actors may be provided no matter when or where the scene of the play is laid. Skillful sewing women are ready to alter any costume to make it fit, or to make new ones if necessary. A large concern must invest many thousand dollars in costumes and "properties" in order to be ready.

This is the interior of a great picture studio with its bewildering tangle of wires and pipes and its many lights. As you see two different plays or at least two scenes are being rehearsed at the same time. One of the scenes is supposed to take place by daylight, and the other evidently is in a parlor in the evening. When the director has made his explanations and is satisfied that the actors understand what he wishes done, the camera will begin.

Pictures from Brown Bros.

been exhausted. A current of electricity is conducted through these and the mercury vapor becomes incandescent. These tubes look like white-hot icicles, and throw a curious, green light over everybody and everything, while the big flaming arc lights, hanging from the roof, nearly blind you with their fierce glare.

These powerful lights shine directly on the scene, and while the operator turns the crank of his machine the film inside is rapidly moving and recording the images of all of the actors. When the actors are done, the director calls "Camera!" and the crank stops. The picture of that particular scene has been taken, and the director and his company are ready for the next.

Some of the scenes may be taken in the open air, showing forests or mountains for a background, or perhaps a street scene may be introduced. A picture of a crowd or a procession is often taken by several cameras stationed at different places, and then parts, or the whole of each film are joined together in one reel. Some pictures which tell stories of the Civil War were taken on the actual battlefields. Sometimes actors are sent to Europe, or even to Asia and Africa in order that the scenes may be correct.

All of you like the cowboy and Indian pictures you have seen. In some of these, the acting is most realistic, the actors actually tumbling headlong from bucking ponies, dashing over rocks, and climbing trees post haste with the supposed enemy after them at full speed. Many of the outdoor pictures are taken in Southern California or Arizona, because of the clearness of the air and the few cloudy days. Then too the climate is such that picture-making can go on all the year.

WHAT HAPPENS TO THE FILMS WHEN THEY HAVE BEEN EXPOSED

The films of the different scenes, now carefully protected from the light, are taken out of the camera, placed in round flat tin cans, and taken to the dark room, where the negative is developed and a print made, or else it is thrown upon the screen in the editorial rooms, where it is edited just as a story would be. This means that all unnecessary parts are cut out, the scenes are made to follow each other in proper order, titles and explanations are put in, and the revised film itself is thrown on the screen for the final criticism.

Often some parts must be done over several times. Very often parts of the picture are not made in the same order that they are to appear. When everything is as it should be, this revised negative goes to the factory, and from it are made the hundreds of copies which go to the moving picture exchanges to be rented to the theatre managers all over the country. So now when you see your

An operator turning the crank of a moving picture camera. Much of the success of a picture depends upon the skill of the operator.

favorite film thrown on the stage, you will have a fair idea of the process by which it came there.

The discovery of the celluloid film is what enabled Thomas A. Edison, "the wizard of electricity," to complete the kinetoscope, the first commercial invention to show men and animals in natural movement. Since then many patents have been taken out by different inventors.

THE WONDERFUL PICTURES CALLED KINEMACOLOR

Kinemacolor is a name given to moving pictures in color produced in a particular way. Before this process was discovered

MAKING PICTURES OUT OF DOORS

Here is the courtyard of a studio where preparations are being made for an open air picture. From the costumes and the flag we can see that it will probably represent a fight between English soldiers and Arabs, or some other Eastern people. When all are ready they will go to an open field, as you will see in the picture below, where some of the horsemen appear again. A moving picture studio which makes outdoor scenes must have a large tract of land attached, on which horses and men may move freely.

This picture made with an ordinary camera shows how an outdoor picture is made. The men representing British soldiers charge over the hill while the director gives instructions through a megaphone. Meanwhile the two men are making sixteen pictures a second with the motion picture camera. The next scene will probably show a fight between these men and another party. Perhaps another camera is taking them as they approach this party. When they meet perhaps both cameras will be kept at work so that different incidents in the battle may be shown in turn.

Pictures from Brown Bros.

everything pictured on the screen was in black and white and no one realized that a moving picture camera could take people in a pink and white apple orchard or a lovely red rose garden, and reproduce them in all their natural colors. But men continued to experiment with color photography, and some one thought out the idea of taking first one picture on the film through a red glass screen, or color filter, as it was called, the next through a green filter, and so on through alternate red and green screens.

The red glass filter allowed all the colors of light except red to pass through and strike the plate. The green filter allowed the red to pass through but kept back all others. When this film with its pictures, half made with red rays and half with green, is placed in the picture machine to be thrown on the screen, the green and red filters are revolved in front of it, and before the impression of a picture made with green rays has gone, a red one follows; and to our eyes the scene appears in the color of nature.

But before this could be done the chemist was called upon again to speed up his already sensitive film so that it would be still more sensitive and receive the rays of red light readily; for the red rays of light are the longest of all and the slowest to make any impression upon the film. Now the developed film has no color in itself; it is merely a black and white image; but as red and green light, properly blended, give every tint between black and pure white, these pictures, when projected or thrown on the stage screen through the proper filters, show in all their natural colors. In fact, while the camera separates the colors into their primary rays of red and green, the projecting machine and the eye blend them again into their natural tints. If you wish to learn more about color you can turn to page 4523 of our book. Look also in the index under "Color."

In kinemacolor, when a man is wounded and his torn sleeve is lifted there is red blood on his arm, not a black smudge. You can see the difference between dry wood and wet wood, and can tell by this difference in color that a box has fallen into the water. A dull, cheerless room can be made sunny by shimmering yellow curtains at the windows, and a fireside cosy with the warm red glow from crackling logs. Color effects are studied, and the green of the grass and trees, the shining brown coats of the horses, and the varying tints of the costumes worn by the actors in the play are as vivid and real as they are in nature.

The kinemacolor process is quite expensive, as it demands a speed of thirty two pictures a second instead of sixteen, as in the black and white method, and increases the cost of the specially treated film. Then too a story which can be told in a thousand feet of ordinary film requires twice as much.

THE SILENT DRAMA OF THE MOVING PICTURES

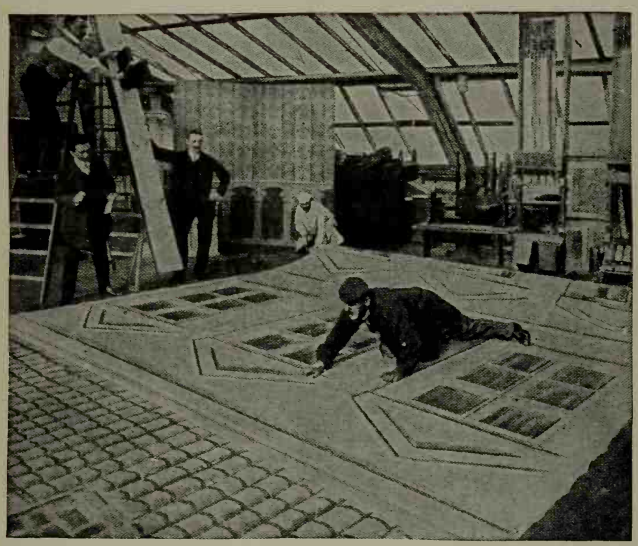
You see people move their lips in the moving picture show but no sound comes from them. You watch horses trot, gallop and canter, yet you hear nothing. *Moving pictures are the art of the silent drama.* They are the art of expression, but without one of the most important means of expression—the voice. Such is their popularity that in the United States alone 5,000,000 people, it is said, witness the stories on their films every day. Some of the more elaborately staged three-reel and six-reel films, such as "The Passion Play," "Ivanhoe," "Return of Ulysses" or "Ben Hur," cost as much as two hundred and fifty thousand dollars to produce, for the pictures of these scenes are often taken on the original sites and such realism is costly. The first three-reel picture ever produced in the United States, if not in the world, was the great "Passion Play," on the roof of the Grand Central Palace in New York. Three thousand feet of film were employed, and forty-eight thousand separate pictures made. This was a wonderful event in the moving picture world, and the "Passion Play" has brought several fortunes to its producers since.

One of the most wonderful motion pictures ever produced is "Quo Vadis," a film based upon a book written by the famous Polish author, Henri Sienkiewicz. It is in eight reels, and the most striking scene is a group of early Christian martyrs in the vast arena of the Coliseum about to be devoured by the wild beasts. The lions are first seen massed together at one end of the great amphitheatre. In the next picture they advance slowly and stealthily and suddenly Christians and lions mingle in a heap on the ground, while the beasts seem fairly to rend their prey. This scene is so real that it is

almost impossible to believe it is not actually happening. Another wonderful picture is "Joan of Arc," showing the life of the peasant girl whose story is told elsewhere in our book. In this picture there is a battle scene with horses galloping and men falling, followed by an attack on a castle which makes you hold your breath.

How trick pictures are sometimes made

Trick pictures are often made by the use of dummies made up to resemble the actors, which are introduced at the proper time. For example, some of you may have seen a picture of what seemed a terrible accident. In such a case, just as a motor car, perhaps, was about to strike a man the camera was stopped and the dummy was substituted. Perhaps the car ran over him and seemed to cut off his legs. These were made to move about by means of invisible wires. Then the doctor came and brought the legs into proper position. Here the camera was stopped again, the actor took the place of the dummy, sprang up and danced about when the camera was started.



How a Man is Photographed Climbing Up a House.

Perhaps you have seen a picture in which a coffee pot seemed to pour itself, lumps of sugar jumped into the cup, and so on. Generally these were managed by wires too small to be seen. Sometimes actions seem to take place backward. This is done by winding the film backward for a little while, by turning the camera upside down, or by a special printing machine.

Pictures showing a man climbing up the side of a house or walking on the ceiling are sometimes made by laying the painted scene representing the wall or the ceiling on the floor while the camera man on a platform near the roof of the studio turns his crank, while the man crawls along the floor. He thus makes a picture which seems true to life. There are dozens of other tricks which are constantly being done, and some of them are kept close secrets. We see impossible things, but cannot guess how the effect was secured.

The great future of the "movies"

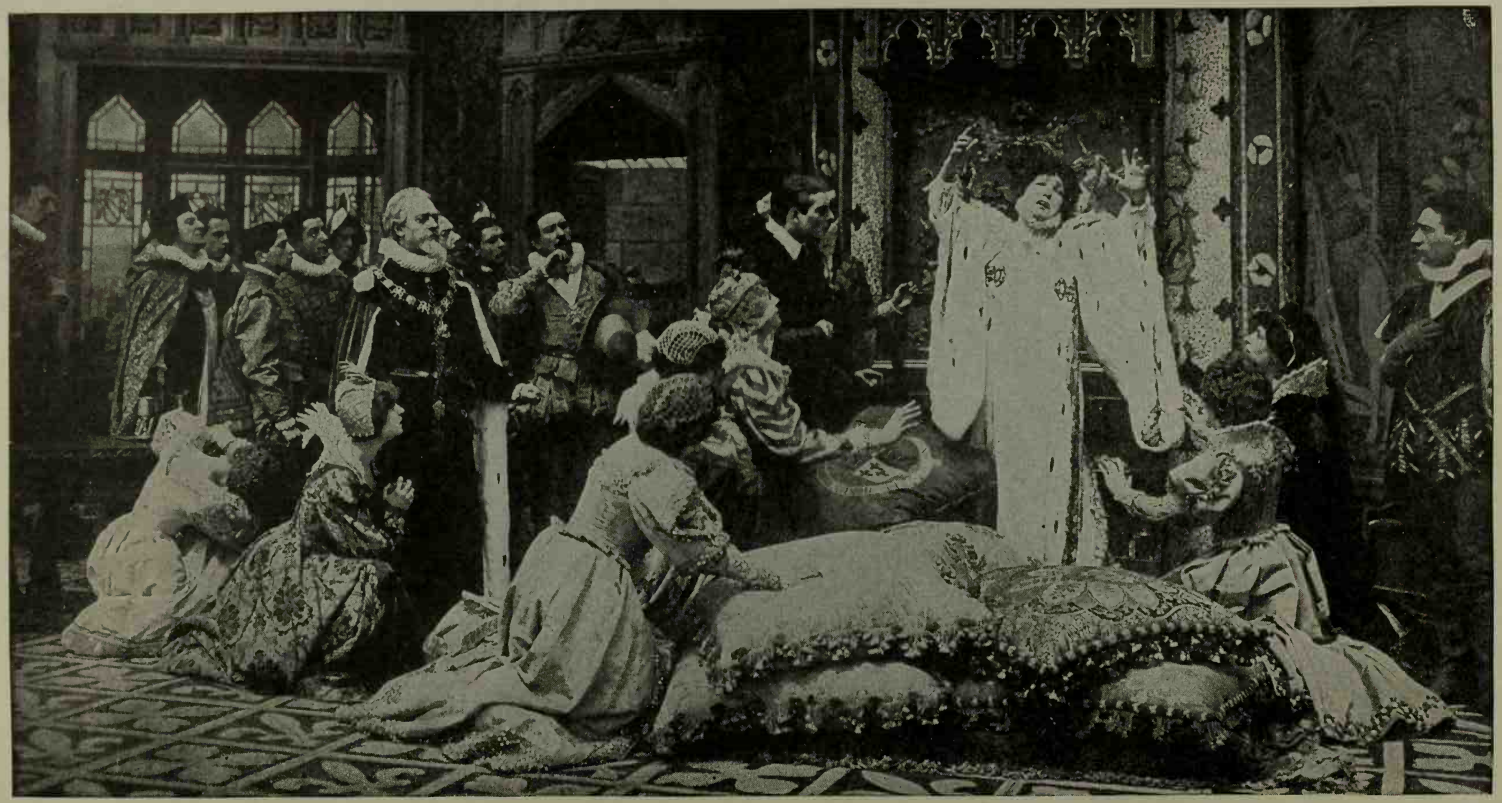
There are many thousand moving picture theatres in the world. Can you imagine what the pictures shown in them may do in time to come? They may teach history and geography by pictures instead of books. Very often, nowadays, moving pictures are made of important events, and copies of the film are stored in safe places. Fifty years from now people may be able to see exactly how people of the present look. What would we not give now to see the inauguration of President Washington?

Some day the pictures will flash before you the great events of the world almost as soon as they happen, when sending pictures by telegraph has been perfected; or they may bring to us pictures of the work of great doctors and surgeons from distant countries, and may even show farmers the latest improved methods of cultivation of the soil.

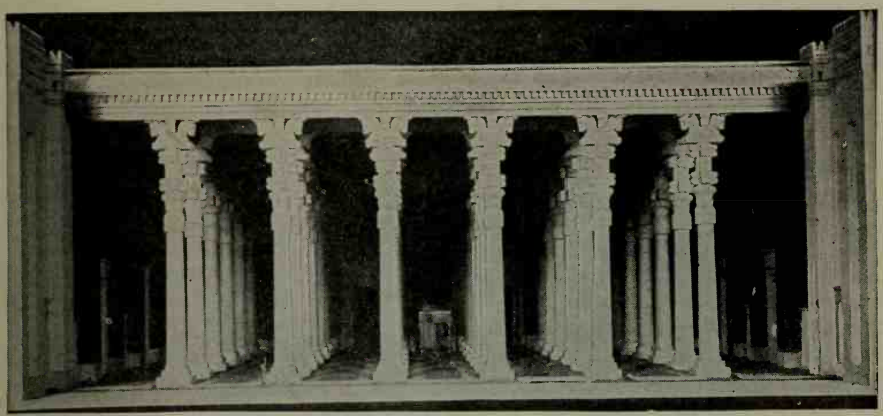
Then, too, Mr. Edison and other inventors have been working to join the talking machine and the pictures. The phonograph will record the words of a speaker or an orator while the camera records his actions. Then while the pictures are being shown the proper words will be spoken.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 5193.

A SCENE FROM QUEEN ELIZABETH AS PLAYED BY SARAH BERNHARDT



Some of the greatest actors and actresses of the day have appeared before the camera. Sarah Bernhardt, the great French actress, and her company are here shown in a scene from Queen Elizabeth. For this play all the stage settings were made with great care, and the costumes were rich and appropriate. The play was so well done that one hardly realized that no words were spoken. A hundred years from now people will be able to see the acting of to-day by means of the films which will be preserved. Without them descriptions could give only a faint idea of how the actors and actresses played their parts.



The Persian kings lived in great luxury, and built magnificent palaces for themselves. In this picture we see the Throne Room of Darius the First at Persepolis, as it was in the days of Persia's glory.

THE RISE AND FALL OF PERSIA

ASIA'S CONQUERORS AT THE GATES OF EUROPE

CONTINUED FROM 4970

AMONG the inscriptions belonging to the centuries when the grand and powerful "sons of Ashur" were building their fine palaces, forming their wonderful libraries, and subduing their neighbors far and wide, are references to expeditions against a power that had for long been steadily growing on their borders.

Persian king's bodyguard.

Dangerous foes, the Assyrian kings called them. They belonged to the Aryan family of nations, from which we ourselves and our neighbors in Europe are descended, and their forefathers came from the mysterious Heart of Asia.

Trained in poverty, strong in body, simple in their lives, they swept down towards the old nations of Western Asia, who were weakened by wealth and long prosperity, like a fresh, keen wind blowing down a hot valley from the snowy mountains above.

Some of the newcomers settled between Assyria and the Caspian Sea, and are known to us as the Medes. The first of their kings about whom we can be certain was Cyaxares, who became the ally of Nabopolassar, who led the Babylonians in the final struggle against Assyria. It was Cyaxares himself who took Nineveh, in those awful days of flame and terror which gave the death-blow not only to the magnificent city, but to the empire of the "king of multitudes," as Ashur-bani-pal and the rest loved to call themselves. Nabopolassar, who became the founder of the New Babylonian monarchy, had the southern part of the great empire for his share, while Cyaxares stretched the boundary of his country of Media over Assyria, and right away westwards till it touched the kingdom of Lydia in Asia Minor.

The successor to this enlarged Median kingdom was Astyages, who was dethroned by one of the great generals that stand out in the world's history. This was Cyrus—whose picture is on page 5153—who led the Persians from their mountainous home in Persis, by the Persian Gulf, to a series of brilliant victories.

The Persians were of kindred stock with the Medes, for their ancestors had also been born in the bracing air of the central plateaus, and poverty

and hardships had been their training as they rode westwards, feeling the world before them. Cyrus was a vassal of Astyages, and after the revolution which made him king of both the Persians and the Medes, the two nations settled down to an equality, and became, to all intents and purposes, one people.

THE WEALTHY CRŒSUS AND THE ALL-CONQUERING CYRUS

The genius of Cyrus soon led him to extend this Medo-Persian Empire over the western part of Asia Minor. There was in Lydia at that time a king so rich that the expression "as rich as Crœsus" has passed into a proverbial way of describing a man of great wealth. He did his best to arm his country against the invaders, but his allies failed him, and in the most tragic and rapid manner Cyrus became master of all the part of Western Asia that is washed by the Black Sea and the Mediterranean.

And then, about 539 years before Christ, came the turn of Babylon! Some of the barrel-shaped cylinders on which Babylonian history is written are now to be seen in the British Museum. Those of Nabonidus, King of Babylon at the time that Crœsus was doing all he could to defend himself against the invincible Cyrus, tell of the searching for records of olden times, of the building and rebuilding of temples for the gods, and of the prayers Nabonidus offered up for himself and his son Belshazzar.

How strange it seems to us! The father absorbed in past history, and honoring the gods; the son carelessly feasting; while the renowned Cyrus, with his army, was actually outside the huge walls, using the powers of his great mind to take their capital!

AN ARMY THAT MOVED A MIGHTY RIVER OUT OF ITS WAY

His cylinder gives the account of how he did it; how the tawny waters of the Euphrates, which flowed through the city, were changed from their course, and the army poured in by the river-gates. It tells, too, how the conquerors entered without battle, so that the city was spared tribulation. Mention is also made of the homage and tribute paid by the inhabitants and peoples round, and how Cyrus pleased the people by restoring the images of the gods to the shrines to which they belonged in other parts of the country. The tablets of this reign and the succeeding ones show that life went on in the city and country much as it had done before the Persian conquest.

The hum of the old busy life seems to fill our ears as we read from the clay records of the trade and agriculture, the debts and loans, the planting of date-groves, the apprenticeship of youths to learn trades, such as baking, weaving, stone-cutting, with hundreds of other details, as appropriate to the life of to-day as to that of the age of Cyrus.

The religion of the newcomers differed at first very much from that of the Babylonians and Assyrians. It was much simpler and purer, though as time went on it was influenced by the idolatries of the older people. Ormuzd was the name of the one great god in whom they believed, and whom they thought sent the people victory and safety and every other blessing.

THE WISE MEN OF THE EAST WHO WORSHIPPED FIRE AND SUN

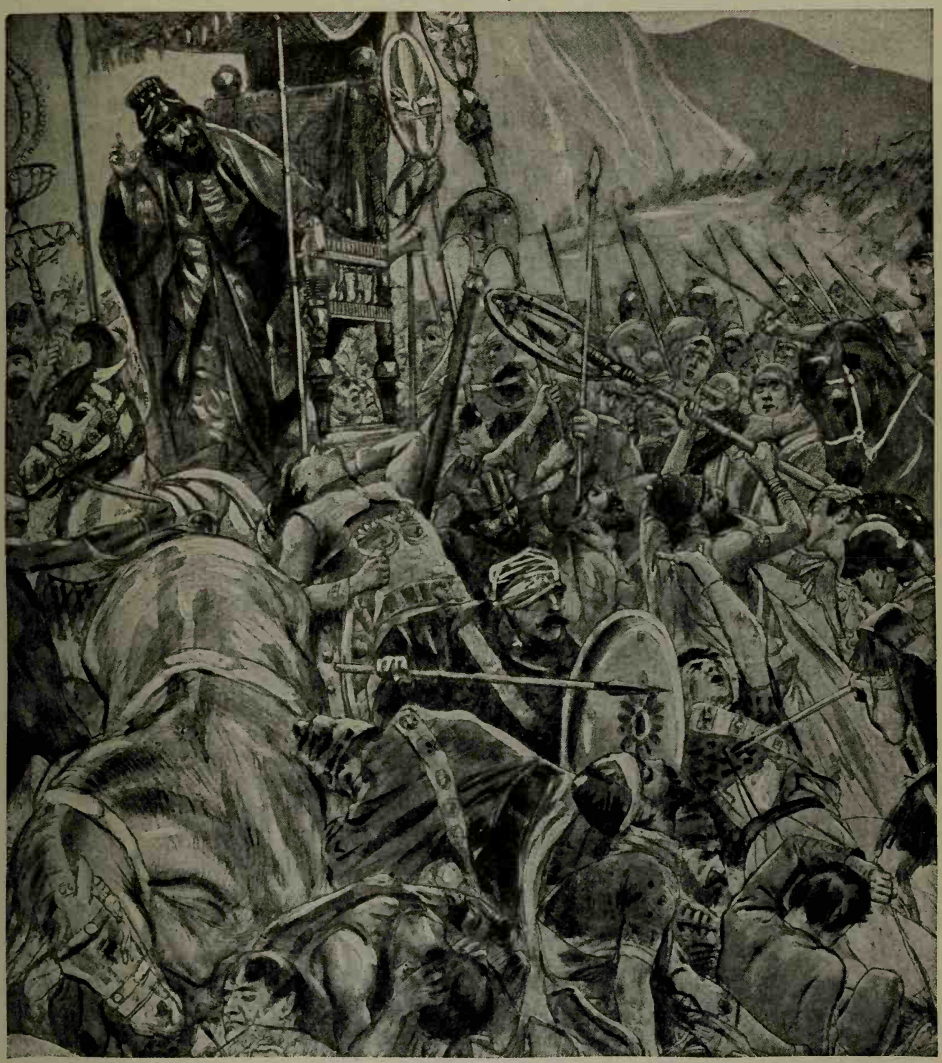
The famous old faith from the Far East, which held the sun and fire in adoring reverence as the expression of the All Ruler of the world, was taught to the Medes and Persians by the great Zoroaster. The priests of this wonderful religion were the magi, or wise men, who, later on, became very powerful in the state.

Cyrus showed much sympathy with the Jews, who also were worshippers of one God, and had been long held captive in the country he had conquered. It was in his day that the joyful processions of the Great Return began to set out across the desert from Babylonia towards the home which they so ardently longed for. As they went, they sang the songs that were impossible to them in the "strange land" of their exile.

After the great Cyrus came his son Cambyses, who wrought much misery and havoc in his own family and in Egypt, where he went as conqueror.

Darius the Great, who followed Cambyses, though not of the family of Cyrus, was a vigorous and strong ruler, crushing rebellions as they arose in the various parts of his immense empire, and arranging for its government and good order with great ability. Many tablets which comprize documents of the reign of Darius, and tell of the sale of houses and lands, partnerships and loans of

THE FLIGHT OF DARIUS, THE PERSIAN KING



Alexander the Great totally defeated a huge Persian army at the battle of Issus, and in this picture we see the Persian king, another Darius, fleeing from his chariot, which is surrounded by the Greeks. So confident had he been of victory, that he had brought his family to the battlefield to see the defeat of the Greeks.

The chariots of the Persians, with huge knives fastened to the wheels, had always struck terror into their enemies; but the Greeks rendered them useless by wounding horses and drivers with arrows and javelins.

silver, have been discovered and translated.

Much about this king has been learned from the various inscriptions found on rocks—chiefly that of the rock of Behistun, which has proved such a valuable key to reading the cuneiform writing. The account of the wars and conquests of the great king had to be cut in the Babylonian language, and the language of the Elamites as well as in Persian, so that the chief nations under his rule might read and understand. Cut in the rock, there is a fine portrait of the king as he stood to receive the submission of the chiefs, of revolted nations, who were brought before him fastened together by a rope around their necks.

Other portraits of Darius are on his gold and silver coins, which were of great use in the trade that grew up between the various provinces of the empire.

KING DARIUS, THE HUNTER OF LIONS AND THE FRIEND OF DANIEL

A cylinder seal of the king, which gives his name in the three languages, and shows him hunting a lion from his chariot, reminds us of the particulars that we have of this king in the Bible story of Daniel. On the slabs of the Assyrian kings we can see the cages in which the lions were brought to the hunting-fields from dens such as the one into which the aged Daniel was thrown, and a seal—the kind that is rolled over moist clay—is shown, that might well be the one which Darius used to prevent any tampering with the order he had so reluctantly given. The word of the king, once passed, by the laws of the Medes and Persians, could never be broken.

Of late years the sites of the great cities of the empire have been dug over, and wonderful remains have been found and studied. We can see at Persepolis the ruins of the greatest of the palaces, not only its ground plan, but the "noblest flight of stairs in the world," and grand gateways with bulls copied from those in the Assyrian palaces. Here, too, are the ruins of the magnificent pillared halls—larger than any cathedral in England. The sculptures show us the Persian guardsmen and attendants who waited on the great kings. At Susa, the ancient capital of the Elamites, and at Ecbatana, the great city of the Medes, are also found remains of splendid palaces built by Darius and his successors. As we look at the map to find these cities, and note the extent of the dominions of Darius, we are filled with wonder.

A KING'S DREAM OF TWO EMPIRES, AND THE VOICE AT THE ROYAL FEAST

From countries round the Indus river the empire stretched to the Caspian and Mediterranean seas, and far into Egypt, where Darius improved or built a canal from the Nile to the Red Sea. Great roads connecting the various provinces, bridges, inns, watch-towers, were built by his orders, and a royal post was established. Darius also made his way across the Bosphorus into Europe, and across the Danube, extending the boundaries of the empire and paving the way to attempt further conquest in the West.

For a great struggle was coming on. The provinces in Asia Minor, which Cyrus gained for the Persian Empire, were peopled by Greeks from over the sea of many islands. These people loved freedom, and hated the government of an absolute monarchy. By degrees discontent led to rebellions; rebellions to savage punishments and threats of vengeance. Particularly angry was Darius with the Athenians, who had not only dared to help their fellow-countrymen across the sea, but had refused to submit in any way to the great kings.

While he was nursing his plans to make himself absolute master of the revolted states, and of Greece, and perhaps of all Europe beyond, it is said that he had these words said to him three times a day, when he sat at his luxurious feasts: "Master, remember the Athenians."

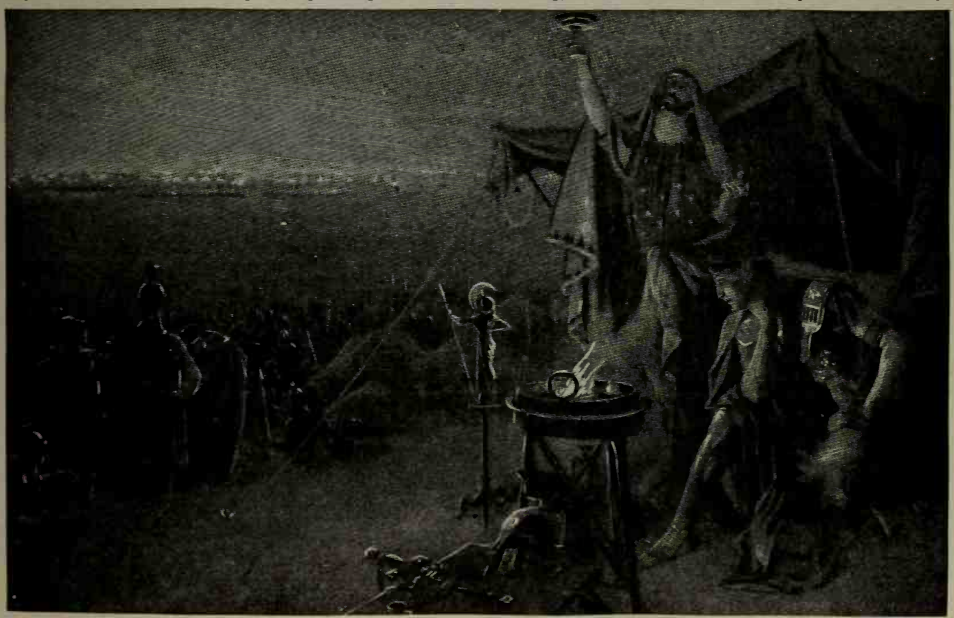
HOW DARIUS MARCHED INTO EUROPE OVER A BRIDGE OF BOATS

There was furious fighting with the Greeks of Asia Minor, whose cities were burned, and whose people, often quarreling among themselves, were overcome by the huge numbers of the army of Darius, and were beaten down and destroyed. So the beautiful bright coast with its sunny islands and lovely bays became ruined and desolate.

And then Darius "remembered" the Athenians. He sent an immense army gathered from all the countries of his empire, under his son-in-law, and they marched over a bridge of boats—as Darius had done before when he went to conquer the Scythians on the Danube

ALEXANDER AT THE PERSIAN CAPITAL

After repeatedly defeating the Persians, Alexander reached Persepolis, their magnificent capital, where were gathered hoards of wealth, and it is said that the treasury alone contained a sum equal to $138,000,000, which fell to the Macedonian conquerors. But, although "Master of the World," Alexander was not master of himself. He lacked self-control, and he stained his character by his excessive love of wine. For many days he remained at Persepolis, spending his time in reveling, as shown here, and finally burned the city.



At the battle of Arbela, which was really fought at Gaugamala, about twenty miles from Arbela, Alexander finally overthrew the Persian power, totally defeating the huge army of the later Darius, which some have estimated at over a million men. In this picture Alexander is seen, on the eve of the battle, gazing into an altar fire while a priest is invoking the gods. In the distance can be seen the fires of the Persian camp.

—across the Hellespont, which we now call the Dardanelles, into the country which is now Turkey in Europe. They expected to make short work of the enemy, but the rough seas wrecked their ships, food ran short, and the wild men of Macedonia and Thrace bristled over the rocks and crags, and held the way, so that the army had to return without getting to Athens at all.

THE TERRIBLE MOMENT WHEN THE FATE OF EUROPE HUNG IN THE BALANCE

But Darius, with his great wealth and resources, soon fitted out another expedition. This time it sailed across to Greece in 600 ships, passing the island of Naxos, and landed only a few miles from Athens. It was an awful moment for the Greeks. It was almost worse for them than it would have been for the English if the Spanish Armada had sailed up the Thames and landed at Gravesend.

Great was the excitement, terror, and dismay in the little states of Greece at the news of the landing of the Persian hosts and the burning and sacking of one of their most beautiful and prosperous cities.

The details of the manner in which the Greeks met the trouble we read in the Story of Greece, beginning on page 5199. It is notable that though there were ten times as many Persians as Greeks in the battle of Marathon which followed, the Greeks won the day, and drove back the Persians to their ships. Their attempt to land nearer Athens was prevented, and so a second time the Persians had to return home without any glory. About a hundred generations of men have lived and died since Marathon, but the result of that famous battle affects the world to this day.

THE GREAT ARMY OF THE SOLDIERS OF FORTY-SIX NATIONS

Darius was more furious and determined than ever when the news of Marathon came to him, and he vowed to take no rest till the insolent Athenians were dragged in chains to Susa. Swift messengers were sent along the royal roads to bid the governors of the provinces to send men and money; but, in the midst of his plans, Darius died, and his son, Xerxes, succeeded him. The handsome, gay young man cared more for pleasure and an easy life than for warfare, so that it seemed at first as if the conquest of Greece might be given up. But, in the end, he was persuaded to continue his father's work, and enormous preparations were made for the invasion. The army raised was one of the largest ever seen in the world, greater even than the Grand Army of Napoleon. It is said that forty-six nations sent their best soldiers, men of all colors—black Africans, and tawny and white natives of far-distant parts of Asia. And these soldiers, with their diverse clothing and arms, passed to the war on foot, on horseback, on elephants, on camels, and on ships.

Xerxes was in the midst of the host himself, with an immense following of servants and courtiers, surrounded by every sort of luxury that enormous wealth could provide. How changed was all this from the days of his poor and hardy and successful forefathers!

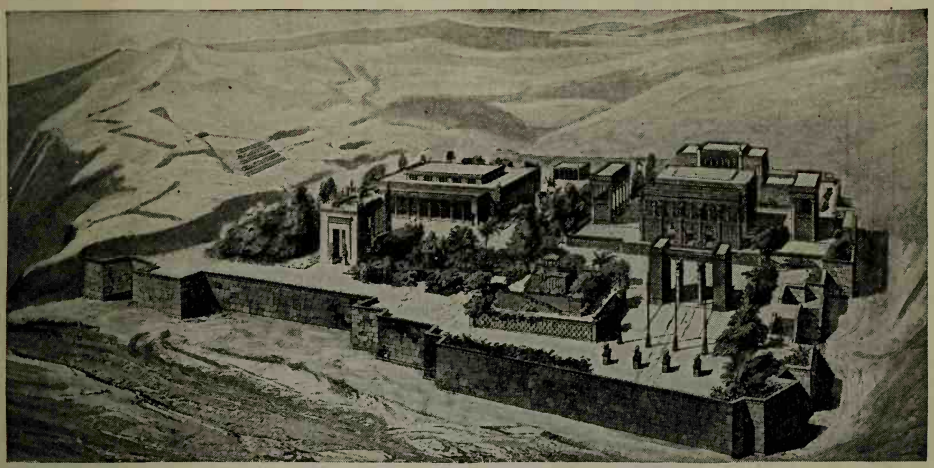
It took the army seven days and seven nights to cross the double bridge of boats across the Hellespont. As it moved on towards Greece, many cities were ruined by having to supply the vast quantity of food that was needed even for a single meal.

THE LITTLE BAND OF SPARTANS WHOSE NAME CAN NEVER DIE

What a prospect for the Greeks! They heard with terror of this multitude moving ever steadily onwards to overwhelm their small country and its small army; especially as at that time there was so much jealousy among the states that it seemed impossible to get them to act together. The Persians had to pass a ridge of high mountains which protected Athens to the north, and between the bog on the edge of the sea and this high ridge there was a pass near some hot springs. This was the pass of Thermopylæ.

Here was fought one of the best and bravest fights in history, one of the few fights where failure was in effect a never-dying victory. A few Greeks held the pass through two days and nights against the hosts of Persians and Medes. These were slain in heaps as they rushed on the solid wall of Greek spears. But a traitor told the Persians of another pass in the mountains, and led the army round by it in the darkness. Some of the Greeks went away; but the little band of Spartans, under Leonidas, determined to conquer or die, and made a final stand, surrounded by overwhelming numbers.

THE GOLDEN CITY OF THE PERSIAN KINGS



This is how the palace of Darius at Persepolis looked in the days of its glory. The ancient writers tell us that no other city could be compared either in beauty or in wealth with Persepolis, "the glory of the East."

The enormous treasures gathered at Persepolis were obtained by oppression and extortion such as few empires have ever practised. Here we see a Persian king in his palace, receiving tribute from conquered peoples.

Not far from the ruins of ancient Persepolis are some wonderful rock tombs, each carved out of the solid stone, with the face of the rock sculptured to represent a temple or palace. Some of the niches where the bodies of kings and princes were laid long ago are now used by the tribesmen as store-places for their grain.

All of them were shot down by Persian arrows to the last man. And so Xerxes got to Athens. Nearly all the inhabitants had fled. He killed the remaining few hundreds, and set fire to the fine buildings, and then marched on to witness the great sea fight from a cliff looking over the Bay of Salamis. No doubt he felt quite certain that his splendid fleet of over a thousand ships, every one of which was well equipped and manned, would make short work of the small Greek fleet, which numbered only about 350 vessels.

But, as the day wore on, Xerxes became more and more uneasy, and at last started up from his ivory throne, which was carried round with him, in wrath and dismay, as his thousand ships crowded and jostled together in the narrow mouth of the bay, so that they could not be properly controlled, and many were run down and sunk. Again and again the loud battle-cry of the Greeks came up to him as they dashed their brazen prows into the ships nearest them, and boarded one after another with the help of their long spears.

How the gallant Greeks drove the huge armies out of Europe

Xerxes raved like a madman before night as he saw his ships, squadron after squadron, turn and sail out to sea. But he, too, ran away homewards, and left his general behind with three times as many men as the Greeks could gather, to finish the campaign later. A few months afterwards this remnant of the great host was destroyed and scattered at the battle of Platæa. And so ended the great Persian wars in Europe, when gallant little Greece for twelve years withstood the largest armies that had ever been collected.

There was a little boy born in Halicarnassus, one of the Greek states in Asia Minor, in the midst of these exciting days when Asia threatened to conquer Europe. He was four when the battles of Thermopylæ and Salamis were fought. When he grew up, his great object in life was to write a full account of the Persians and their world struggle with the Greeks, so he collected materials for his work in various parts of the empire. This was Herodotus, the Father of History, who so admired the Nile and great buildings of Egypt, also the mighty walls, hanging gardens, and temples of Babylon, that he wrote an account of them. Many of his wonderful stories have been proved to be fables, but, in his pleasant, chatty way, he gives us much fact as well as fiction about those soul-stirring times, when actual witnesses of the great events about which he wrote so vividly were still alive.

The beautiful queen of Persia whose story is told in the Bible

For details of the court life of Xerxes, we may turn to the book of Esther in the Bible, for many believe that King Ahasuerus in that story is none other than he who was carried round in the ivory throne and threw fetters into the unruly Hellespont when its storms destroyed the first bridge of boats. However this may be, we can gain a good idea of how the rulers of Persia lived in the days of their great power, by clothing the visions of magnificent palaces shadowed in the ruins unearthed at Susa and Persepolis, with the vivid account of life at their court, as seen by the beautiful and patriotic Jewess who became Queen of Persia.

Artaxerxes, one of the sons of Xerxes, comes into a Bible story too, for he had a Jewish cup-bearer, Nehemiah. He was allowed to leave his duties at court and go to help his brethren to rebuild the walls of Jerusalem and reorganize the government of the state.

In the reign of Darius II., another of the sons of Xerxes, Persia lost Egypt, which it had held, in spite of many rebellions, for more than a hundred years. There were other signs that the great empire was beginning to break up.

The fall of the Persian monarchy and the rise of Alexander

Among these signs were dark plots and quarrels between the nobles and princes, which came to a height when two of the sons of Darius II. were struggling for the throne. Cyrus, the younger, knowing that Greek soldiers were better than the troops gathered together from different nations in Asia, paid 13,000 Greeks to come and help him fight against his brother.

Cyrus was slain and his army defeated at Cunaxa, near Babylon. The Greeks, now reduced to 10,000 men, fought their way back to the coast amid difficulties under the command of Xenophon, the famous historian. The story of this retreat we read on page 5114.

TWO CONQUERING KINGS OF PERSIA

When Cyrus the Great conquered Babylon, he restored to their own land the Jews whom Nebuchadnezzar had carried away captive, returning to them, as shown in this picture by Doré, the golden and silver vessels from their destroyed temple, that they might be used in the new temple which Cyrus ordered to be built.

Xerxes the First gathered a vast army for the invasion of Greece, and built a bridge of boats a mile long across the Hellespont, which is now called the Dardanelles When the stormy waves broke his bridge, he ordered three hundred lasnes to be given to the rebellious sea Here we see the king crossing the Hellespont.

Among the many things these travelers could tell their countrymen on their return were tales of the low state into which the Persian monarchy had fallen by means of indulgence in luxury, by quarrels and weak rulers, and ambitious satraps, or governors, of provinces. They reported, too, how badly the army was managed.

For a time the affairs of Persia revived under a strong king, Artaxerxes III., who subdued Egypt again, and put down many rebellions in the Mediterranean countries. But his reign was cut short, and the kingdom passed to Darius III., one of the weakest and most unfortunate of rulers. And this was the man who had to meet one of the greatest generals of whom history makes any mention, Alexander the Great.

Alexander was the king of the Greek state of Macedon. His father, Philip, who had heard the tales of Xenophon and his men, had died in the midst of his plans for the invasion of Persia; his ambitious son was only too eager to finish and fulfil them.

THE CONQUERING MARCH OF ALEXANDER THAT DESTROYED THE PERSIAN EMPIRE

Crossing the Hellespont in the year 334 before Christ, he won victory after victory in Asia Minor, Phœnicia, and Egypt, with his well-disciplined army, and in the third year of his expedition he won one of the great battles of the world, near Arbela, where the contest was practically decided. The great capitals, Babylon—by this time shorn of much of its former grandeur—Susa, Persepolis, all fell before him; the latter was burned to the ground. It is thought that this disastrous fire was lighted in mad vengeance against the wrongs Greece had suffered from Persia.

The miserable Darius III. was slain soon after by one of his own satraps, and so was extinguished for a time the empire founded by Cyrus the Great about 200 years before.

We are told that Alexander visited the tomb of this hero, which is still standing, and read the inscription: "I am Cyrus the King." For long years priests had guarded the golden coffin which contained the dust of the founder of the Medo-Persian monarchy, now destroyed. Alexander never returned to Greece. He passed on to the Indus and Central Asia, founded many cities, in which he settled Greek colonists, and fixed his capital at Babylon. But his early death prevented his carrying out the vast schemes he had in view to organize as a great world empire the immense Greco-Persian dominion he had conquered.

THE COMING OF THE MEN WHO CRUSHED PERSIAN FREEDOM FOR 400 YEARS

His generals fought wildly for sovereignty after he died, and assassinations, conspiracies, and bloodshed lasted many years, till one named Seleucus, about the year 312 before Christ, became the first of a line of Greek kings of Persia, called after him Seleucidæ. His capital city of Seleucia was on the Tigris.

The difficulties of the Greek rulers and settlers in Persia were even greater than those of the British have been in India, and rebellions and troubles of all kinds harassed the successors of Alexander, who gradually lost ground.

Then, when the Persians began to hope for a chance of regaining their independence, a new and vigorous power suddenly arose in Western Asia, and established an empire in which they were forced to remain as a subject province.

The new-comers were of the same stock as the Medes and Persians, though not so clever or refined. They are known in history as the Parthians, called after the name of the country north of Persia, to which the tribe exiled itself when unable to maintain its freedom against the Greek settlers in distant Bactria.

We should know very little of the Parthians, who ruled in Persia for over 400 years, but for the fact that they were constantly fighting as the years passed on against the Romans, whose historians give us information about the great heroes of this race. Fortunately, too, we have many of their portraits, cut sharp and clear, untouched by the hand of Time or of man since the days they were modeled from life centuries ago.

THE FIGHT BETWEEN PARTHIA AND ROME FOR THE EMPIRE OF THE EAST

Little could Mithridates the Great, Orodes, and other Parthian heroes have guessed that the likenesses engraved on their coins would be eagerly sought for in far-off times and used to form a portrait gallery of their race. One can see many of them in the British Museum, among those of the rulers who went before and came after them in Western Asia. In the Story of Rome we read how the

mighty armies of that empire rolled up eastwards against the Parthians, time after time, like waves thundering against a rocky shore. Sometimes the Romans had the advantage, sometimes it was held by the Parthians, but in the end, just as the Parthian Empire was nearing its fall, its last ruler, Artabanus, about the year 216 Anno Domini, wrested a huge sum of money from the Romans as a war indemnity after two crushing defeats.

About ten years later, the long-prepared and long-delayed insurrection of the Persians occurred, in which they were successful in declaring their independence. Artabanus was slain, and a king, Artaxerxes, or Ardashir, descended from the old Royal House, became head of a new Persian Empire, often called the Sassanian.

For six centuries the Persians had had to submit to a foreign yoke, first that of Alexander and his successors, then to that of the Parthians. But during that time they never allowed themselves to forget their ancient glories, their purer religion, and the future hopes of their race.

How Persia rose to power again after hundreds of years

When the right moment came, by swift revolution and decision, the old empire sprang to life once more. On the back of the coins of Artaxerxes is a picture of the sacred fire, tended by a priest, showing the religious side of the uprising and remaking of the empire. The idols of the Parthians were destroyed, and the magi, or wise men, who taught the old faith of Zoroaster, were gathered together at Persepolis and given an important share in the government.

It was at this time that the sacred precepts and sayings of the Persians were collected and put into writing. We can read to-day these beautiful teachings in the Zend-Avesta, as the Sacred book of the Persians is called. It is still the guide of many learned and good men, the Parsees of Persia and India.

Artaxerxes also re-established the government much after the form of that of Darius the Great. Much of the art of the Sassanian times has been recovered from the ruins of their great cities, and a deeply interesting study it makes, bringing home to us how much wealth and magnificence and taste for the beautiful belonged to these centuries of national revival. Many were the wars during the reigns of the Sassanian kings, some of whom were splendid generals. Among them there stand out the names of two kings named Sapor, and of two named Chosroes. The first Sapor accomplished the brilliant feat of making the Roman Emperor Valerian surrender with all his army; this event is shown on a huge rock sculpture.

The breathless race to the gates of the city

The second Sapor overthrew the Emperor Julian in a most thrilling campaign. The Romans had a large fleet of boats on the Euphrates, and in a sculptured picture on a rock we may see Julian transporting his fleet and army by canal from the Euphrates to the Tigris and meeting the Persian army with its elephants and chariots. Then there was a breathless race to get to the important city of Ctesiphon. The Persians dashed in first and just closed the gates upon their pursuers.

The end of this exciting campaign saw the great Julian dead, and his successor was forced to listen to terms from Sapor such as the all-conquering Romans had never before granted.

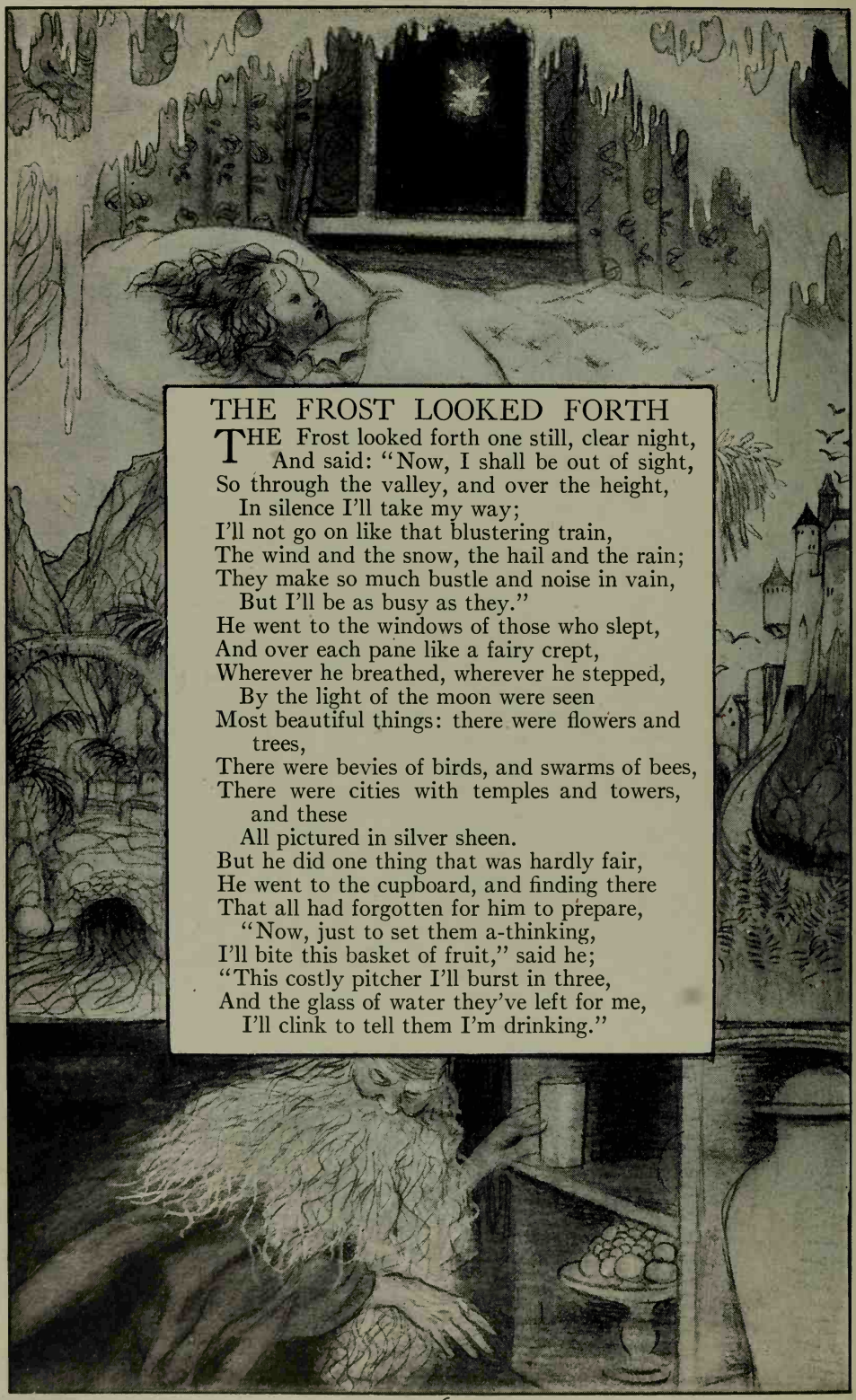
The reigns of the two Chorsoes bring us to the times of conflict with the Eastern emperors, Constantine and Heraclius, as we read on page 3860.

How Persia lay under the conqueror's heel for 800 years

The conquerors of the Eastern Empire were also the conquerors of Persia. When the famous leathern standard, the blacksmith's apron studded with diamonds and other precious stones, fell into the hands of the Mohammedans after four days of terrible fighting, the nation it had so often led to victory, ever since the far-off days before Cyrus, passed into subjection, and lay under the heel of the conqueror for over 800 years.

The national religion and the national independence were gone, but the spirit was not dead nor the national ability and courage, and at last the time came for Persia to rise again with renewed life and strength. We read the later story of this country on page 3855. It may well take pride even to-day in its long and wonderful record of the past.

THE NEXT STORY OF COUNTRIES IS ON PAGE 5199.



THE FROST LOOKED FORTH

THE Frost looked forth one still, clear night,
And said: "Now, I shall be out of sight,
So through the valley, and over the height,
In silence I'll take my way;
I'll not go on like that blustering train,
The wind and the snow, the hail and the rain;
They make so much bustle and noise in vain,
But I'll be as busy as they."
He went to the windows of those who slept,
And over each pane like a fairy crept,
Wherever he breathed, wherever he stepped,
By the light of the moon were seen
Most beautiful things: there were flowers and trees,
There were bevies of birds, and swarms of bees,
There were cities with temples and towers, and these
All pictured in silver sheen.
But he did one thing that was hardly fair,
He went to the cupboard, and finding there
That all had forgotten for him to prepare,
"Now, just to set them a-thinking,
I'll bite this basket of fruit," said he;
"This costly pitcher I'll burst in three,
And the glass of water they've left for me,
I'll clink to tell them I'm drinking."

A GREAT POEM BY SHELLEY

POETS without number have addressed odes to the skylark and endeavored to describe the joyous song the bird pours forth as it wings skyward; but not very many have succeeded. One of the finest poetic descriptions of the skylark and its song was written by the late George Meredith, and in some respects his poem is considered finer than this famous ode by Percy Bysshe Shelley, though it is not so well known. There is scarce a line in these twenty-one verses that is not perfect in the beautiful image it raises in our mind's eye or the thought it suggests to us. The whole poem is a glorious achievement of art. That is, perhaps, its fault, as in reading it we are not so much conscious of the skylark itself as we are of the poet telling us in his golden speech about the little singer of the skies. It is none the less one of the shorter masterpieces of English poetry, and contains many phrases of such perfect form that they will remain for ever in our memory.

THE SKYLARK

CONTINUED FROM 5068

HAIL to thee, blithe spirit!
Bird thou never wert,
That from heaven, or near it,
Pourest thy full heart
In profuse strains of unpremeditated art.

Higher still, and higher,
From the earth thou springest
Like a cloud of fire;
The blue deep thou wingest,
And singing still dost soar, and soaring ever singest.

In the golden lightning
Of the sunken sun,
O'er which clouds are brightening,
Thou dost float and run,
Like an unbodied joy whose race is just begun.

The pale purple even
Melts around thy flight;
Like a star of heaven
In the broad daylight,
Thou art unseen, but yet I hear thy shrill delight.

Keen as are the arrows
Of that silver sphere,
Whose intense lamp narrows
In the white dawn clear,
Until we hardly see, we feel that it is there.

All the earth and air
With thy voice is loud,
As, when night is bare,
From one lonely cloud
The moon rains out her beams and heaven is overflowed.

What thou art we know not;
What is most like thee?
From rainbow clouds there flow not
Drops so bright to see,
As from thy presence showers a rain of melody.

Like a poet hidden
In the light of thought,
Singing hymns unbidden,
Till the world is wrought
To sympathy with hopes and fears it heeded not.

Like a high-born maiden
In a palace tower,
Soothing her love-laden
Soul in secret hour
With music sweet as love, which overflows her bower.

Like a glow-worm golden,
In a dell of dew,
Scattering unbeholden
Its aerial hue
Among the flowers and grass, which screen it from the view.

Like a rose embowered
In its own green leaves,
By warm winds deflowered,
Till the scent it gives
Makes faint with too much sweet these heavy-winged thieves.

Sound of vernal showers
On the twinkling grass,
Rain-awakened flowers,
All that ever was
Joyous, and clear, and fresh, thy music doth surpass.

Teach us, sprite or bird,
What sweet thoughts are thine;
I have never heard
Praise of love or wine
That panted forth a flood of rapture so divine.

Chorus hymeneal,
Or triumphant chant,
Matched with thine, would be all
But an empty vaunt—
A thing wherein we feel there is some hidden want.

What objects are the fountains
Of thy happy strain?
What fields, or waves, or mountains?
What shapes of sky or plain?
What love of thine own kind? What ignorance of pain?

With thy clear keen joyance
Languor cannot be:
Shadow of annoyance
Never came near thee:
Thou lovest, but ne'er knew love's sad satiety.

Waking or asleep,
Thou of death must deem
Things more true and deep
Than we mortals dream,
Or how could thy notes flow in such a crystal stream?

We look before and after,
And pine for what is not:
Our sincerest laughter
With some pain is fraught:
Our sweetest songs are those that tell of saddest thought.

Yet if we could scorn
Hate, and pride, and fear;
If we were things born
Not to shed a tear,
I know not how thy joy we ever could come near.

Better than all measures
Of delight and sound,
Better than all treasures
That in books are found,
Thy skill to poet were, thou scorner of the ground!

Teach me half the gladness
That thy brain must know,
Such harmonious madness
From my lips would flow,
The world should listen then, as I am listening now.

HOLYROOD

In this imaginative little poem by Mr. Will H. Ogilvie, a living writer of distinction, we have a very good test of our knowledge of Scottish history. Holyrood is, perhaps, the most historic building in Scotland; it is full of memories of the kings and queens who reigned at Edinburgh, and the poet supposes the ghosts of all these vanished figures to be thronging the ancient halls, with no one there for witness but the pale moon. We have not space here to explain the many allusions which the poet makes, but if our readers have studied carefully the story of Scotland they will not have great difficulty in understanding them.

THE moon held court in Holyrood last night
—ten thousand stars
By ancient tower and archway climbed and kissed the window-bars.
The night wind knelt upon the hill, the crouching lion lay
With shoulder to the capital and blind eyes to the bay.
The moon held court in Holyrood, and as she entered in,
On damask fringe and tapestry the spider ceased to spin.
The slow moon slipped across the floor and bowed a queenly head
To greet the train that passed her by—a thousand sleepless dead.
She drifted down the storied hall and touched with spread white wings
The gallery of a hundred dead; the corridor of kings.
She smiled upon a rebel prince, and stretched white hands to shrive
The gallant men, the peerless maids, that danced in "Forty-five."
She crossed a sleeping-chamber, hung with trappings rich and rare,
And kissed them softly one by one; it was a queen lay there.
She heard the lute notes rise and fall, she watched the dagger sped,
While underneath her trembling wings the brown stain turned to red.
The moon held court in Holyrood, and from the northern tower
She looked along the High Street sad at heart for Scotland's flower,
And looking saw a rider pass, pale-faced and battle-worn
Beneath the drooping Flodden flag, all red and slashed and torn!

The moon passed out of Holyrood, white-lipped to open sky;
The night wind whimpered on the crags to see the ghosts go by,
And stately, silent, sorrowful, the lonely lion lay
Gaunt shoulder to the capital and blind eyes to the bay.

THE PILGRIM FATHERS

This spirited poem by Mrs. Hemans, who is well represented in our Book of Poetry, describes one opening chapter in the history of the great American nation, for the powerful United States of to-day had very small beginnings. On December 21, 1620, the Pilgrim Fathers, much dissatisfied with the rule of King James I., and the harsh restrictions from which they had long suffered in their native land, landed from their little ship, the Mayflower, and founded the colony which later grew powerful enough to join with the other colonies in asserting and gaining their independence.

THE breaking waves dashed high
On a stern and rock-bound coast,
And the woods against a stormy sky
Their giant branches tossed;

And the heavy night hung dark,
The hills and water o'er,
When a band of exiles moored their bark
On the wild New England shore.

Not as the conqueror comes,
They, the true-hearted, came;
Not with the roll of the stirring drums,
And the trumpet that sings of fame;

Not as the flying come,
In silence and in fear—
They shook the depths of the desert's gloom
With their hymns of lofty cheer.

Amidst the storm they sang,
And the stars heard, and the sea;
And the sounding aisles of the dim woods rang
To the anthem of the free!

The ocean-eagle soared
From his nest by the white waves' foam;
And the rocking pines of the forest roared—
This was their welcome home!

There were men with hoary hair
Amidst that pilgrim band:
Why had they come to wither there,
Away from their childhood's land?

There was woman's fearless eye,
Lit by her deep love's truth;
There was manhood's brow serenely high,
And the fiery heart of youth.

What sought they thus afar?
Bright jewels of the mine?
The wealth of seas, the spoils of war?—
They sought a faith's pure shrine!

Ay, call it holy ground,
The soil where first they trod.
They have left unstained what there they found—
Freedom to worship God.

GOOD-BYE

Emerson, the American philosopher and poet here expresses a philosopher's discontent with the garish world, and the peace of mind that comes to him by his own fireside or in the wild wood, where he can afford to despise the glowing stories of the world's vanished pomp in the knowledge that a contented mind is better than all worldly ambitions.

GOOD-BYE, proud world! I'm going home;
Thou art not my friend, and I'm not thine.
Long through thy weary crowds I roam;
A river-ark on the ocean brine,
Long I've been toss'd like the driven foam,
But now, proud world, I'm going home.

Good-bye to flattery's fawning face,
To grandeur with his wise grimace,
To upstart wealth's averted eye,
To supple office, low and high,
To crowded halls, to court and street,
To frozen hearts and hasting feet,
To those who go, and those who come—
Good-bye, proud world! I'm going home.

I am going to my own hearth-stone,
Bosomed in yon green hills alone—
A secret nook in a pleasant land,
Whose groves the frolic fairies planned;
Where arches green, the livelong day,
Echo the blackbird's roundelay,
And vulgar feet have never trod—
A spot that is sacred to thought and God.

Oh, when I am safe in my sylvan home,
I tread on the pride of Greece and Rome,
And when I'm stretched beneath the pines,
Where the evening star so holy shines,
I laugh at the lore and pride of man,
At the sophist schools, and the learned clan;
For what are they all, in their high conceit,
When man in the bush with God may meet?

A PARABLE

A parable, of course, is a story designed to convey a lesson, and may be written either in prose or in verse. James Russell Lowell, the American poet, conveys a very beautiful lesson in this poem. We often hear it said by sneering critics that though the Bible stories tell us of the miracles which the prophets of old were favored with, no miracles now take place. Yet the bursting into flower of a little mountain violet is as great a miracle as we require to witness in order to believe in the everlasting Power that guides and sustains this world of ours. The word "eld" in the seventh verse means "olden time," and comes from the Anglo-Saxon.

WORN and footsore was the Prophet,
When he reached the holy hill;
"God has left the earth," he murmured;
"Here His presence lingers still.

"God of all the olden prophets,
Wilt Thou talk with me no more?
Have I not as truly loved Thee
As Thy chosen ones of yore?

"Hear me, Guider of my fathers,
Lo, a humble heart is mine;
By Thy mercy, I beseech Thee,
Grant Thy servant but a sign!"

Bowing then his head, he listened
For an answer to his prayer;
No loud burst of thunder followed,
Not a murmur stirred the air;

But the tuft of moss before him
Opened while he waited yet,
And from out the rock's hard bosom
Sprang a tender violet.

"God, I thank Thee," said the Prophet.
"Hard of heart and blind was I,
Looking to the holy mountain
For the gift of prophecy.

"Still Thou speakest with Thy children
Freely as in Eld sublime,
Humbleness and love and patience
Give dominion over Time.

"Had I trusted in my nature,
And had faith in lowly things,
Thou Thyself wouldst then have sought me,
And set free my spirit's wings.

"But I looked for signs and wonders
That o'er men should give me sway;
Thirsting to be more than mortal,
I was even less than clay.

"Ere I entered on my journey,
As I girt my loins to start,
Ran to me my little daughter,
The beloved of my heart;

"In her hand she held a flower,
Like to this as like may be,
Which beside my very threshold
She had plucked and brought to me."

THE TWO ARMIES

Oliver Wendell Holmes reads us here an old and familiar lesson. It is, perhaps, a poetic exaggeration to say the motto of valor's army is, "Our glory is to slay." It is easy too, to contrast the ruthless work of the fighters, and the honor so readily awarded them, with the merciful and often unnoticed ministrations of the lovers of peace. But it is well that the kindly poets who love the quiet ways of life should thus remind us of those who serve in the army of peace, as there are always too many ready to sing the praises of the fighters.

AS Life's unending column pours,
Two marshalled hosts are seen—
Two armies on the trampled shores
That Death flows back between.

One marches to the drum-beat's roll,
The wide-mouthed clarion's bray,
And bears upon a crimson scroll,
"Our glory is to slay."

One moves in silence by the stream,
With sad, yet watchful eyes,
Calm as the patient planet's gleam
That walks the clouded skies.

Along its front no sabres shine,
No blood-red pennons wave;
Its banner bears the single line,
"Our duty is to save."

For those no death-bed's lingering shade;
At Honor's trumpet-call,
With knitted brow and lifted blade
In Glory's arms they fall.

For these no clashing falchions bright,
No stirring battle-cry;
The bloodless stabber calls by night—
Each answers, "Here am I!"

For those the sculptor's laurelled bust
The builder's marble piles,
The anthems pealing o'er their dust
Through long cathedral aisles.

For these the blossom-sprinkled turf
That floods the lonely graves
When Spring rolls in her sea-green surf
In flowery-foaming waves.

Two paths led upward from below,
And angels wait above,

Who count each burning life-drop's flow,
Each falling tear of Love.
Though from the hero's bleeding breast
Her pulses Freedom drew,
Though the white lilies in her crest
Sprang from that scarlet dew—
While Valor's haughty champions wait
Till all their scars are shown,
Love walks unchallenged through the gate,
To sit beside the throne!

SUPPOSE THE LITTLE COWSLIP

We have published in our book many little poems by unknown writers, simply because they have long and deservedly been children's favorites, and on this ground we can scarcely deny a place to these simple and pleasing verses.

SUPPOSE the little cowslip
Should hang its golden cup;
And say, "I'm such a tiny flower,
I'd better not grow up!"
How many a weary traveller
Would miss its fragrant smell!
How many a little child would grieve
To lose it from the dell!

Suppose the glistening dew-drop
Upon the grass should say,
"What can a little dew-drop do?
I'd better roll away!"
The blade on which it rested,
Before the day was done,
Without a drop to moisten it
Would wither in the sun!

How many deeds of kindness
A little child can do,
Although it has but little strength,
And little wisdom too!
It wants a loving spirit
Much more than strength, to prove
How many things a child can do
For others, by its love.

BONNIE JEAN

The tender feeling which breathes through every line of this most charming love lyric makes it a gem of its kind, and it ranks among the finest of Burns' many songs. The third and fourth verses are thought to have been written by another poet, but they are in perfect harmony with the opening verses.

OF a' the airts the wind can blaw,
I dearly love the West,
For there the bonnie lassie lives,
The lassie I lo'e best:
There wild woods grow, and rivers flow,
And mony a hill between;
But, day and night, my fancy's flight
Is ever wi' my Jean.

I see her in the dewy flowers,
I see her sweet face and fair;
I hear her in the tunefu' birds,
I hear her charm the air:
There's not a bonnie flower that springs
By fountain, shaw, or green,
There's not a bonnie bird that sings,
But minds me o' my Jean.

O, blaw, ye westlin' winds, blaw saft
Amang the leafy trees;
Wi'balmy gale, frae hill and dale,
Bring hame the laden bees;
And bring the lassie back to me
That's aye sae neat and clean;
Ae smile o' her wad banish care,
Sae charming is my Jean.

What sighs and vows amang the knowes
Hae pass'd atween us twa!
How fond to meet—how wae to part,
That night she gaed awa!
The Powers aboon can only ken,
To whom the heart is seen,
That nane can be sae dear to me
As my sweet, lovely Jean.

THE LAST RIDE TOGETHER

I SAID—Then, dearest, since 'tis so,
Since now at length my fate I know,
Since nothing all my love avails,
Since all my life seemed meant for, fails,
Since this was written and needs must be—
My whole heart rises up to bless
Your name in pride and thankfulness!
Take back the hope you gave,—I claim
Only a memory of the same,
—And this beside, if you will not blame,
Your leave for one more last ride with me.

My mistress bent that brow of hers;
Those deep dark eyes where pride demurs
When pity would be softening through,
Fixed me a breathing-while or two
With life or death in the balance: right!
The blood replenished me again;
My last thought was at least not vain:
I and my mistress, side by side
Shall be together, breathe and ride,
So, one day more am I deified.
Who knows but the world may end to-night?

Hush! if you saw some western cloud
All billowy-bosomed, over-bowed
By many benedictions—sun's
And moon's and evening star's at once—
And so, you, looking and loving best,
Conscious grew, your passion drew
Cloud, sunset, moonrise, star-shine too,
Down on you, near and yet more near,
Till flesh must fade for heaven was here!—
Thus leant she and lingered—joy and fear!
Thus lay she a moment on my breast.

. . . . . .

Who knows what's fit for us? Had fate
Proposed bliss here should sublimate
My being—had I signed the bond—
Still one must lead some life beyond,
Have a bliss to die with, dim descried.
This foot once planted on the goal,
This glory-garland round my soul,
Could I descry such? Try and test!
I sink back shuddering from the quest.
Earth being so good, would heaven seem best?
Now, heaven and she are beyond this ride.

And yet—she has not spoke so long!
What if heaven be that, fair and strong
At life's best, with our eyes upturned
Whither life's flower is first discerned,
We, fixed so, ever should so abide?
What if we still ride on, we two,
With life for ever old yet new,
Changed not in kind but in degree,
The instant made eternity,—
And heaven just prove that I and she
Ride, ride together, forever ride?

ROBERT BROWNING.

LITTLE VERSES FOR VERY LITTLE PEOPLE

I MUST not throw upon the floor
The crust I cannot eat,
For many an hungry little one
Would think it quite a treat.

'Tis wilful waste brings woeful want,
And I may live to say,
"Oh, how I wish I had the crust
That once I threw away."

MARY had a little lamb,
Its fleece was white as snow;
And everywhere that Mary went,
The lamb was sure to go.

He followed her to school one day—
That was against the rule;
It made the children laugh and play,
To see the lamb at school.

So the teacher turned him out,
But still he lingered near;
And waited patiently about,
Till Mary did appear.

Then he ran to her, and laid
His head upon her arm,
As if he said, "I'm not afraid,
You'll keep me from all harm!"

"What makes the lamb love Mary so?"
The eager children cry.
"Oh, Mary loves the lamb, you know,"
The teacher did reply.

MONDAY'S child is fair of face,
Tuesday's child is full of grace,
Wednesday's child is full of woe,
Thursday's child has far to go,
Friday's child is loving and giving,
Saturday's child works hard for its living,
And a child that's born on the Sabbath day
Is fair and wise and good and gay.

UPON yon nearest rock-top
Can you see a dwelling stands?
Ah, 'tis the sweetest dwelling
Found in these mountain lands!

It holds the sweetest lady!
She is rich with golden hair,
Has clever, busy fingers,
Though so small and lily fair.

They wash, they starch, they broider.
They can spin, mix oaten cake,
And grind the white wheat finely,
The dainty loaves to bake.

And when that sweetest lady
Shall be mine, my own to hold,
Ah, earth to match her beauty
Will wear a crown of gold!

THE Owl and the Pussy Cat went to sea
In a beautiful pea-green boat;
They took some honey and plenty of money
Wrapped up in a five-pound note.

The Owl looked up to the stars above
And sang to a small guitar;
"Oh, lovely Pussy, oh, Pussy, my love,
What a beautiful Pussy you are!"

Pussy said to the Owl: "You elegant fowl,
How charmingly sweetly you sing!
Oh, let us be married, too long have we tarried—
But what shall we do for a ring?"

So they sailed away for a year and a day
To the land where the bone-tree grows;
And there in a wood a piggy-wig stood,
With a ring at the end of his nose.

"Dear Pig, are you willing to sell for one shilling
Your ring?" Said the Piggy, "I will."
So they took it away and were married next day
By the Turkey that lives on the hill.

They had apples and quince and piles of mince
Which they ate with a silver spoon,
And hand in hand on the edge of the sand
They danced by the light of the moon.

IN LONDON ONCE I LOST MY WAY

IN London once I lost my way,
In faring to and fro,
And asked a little ragged boy
The way that I should go.
He gave a nod and then a wink,
And told me to get there,
"Straight down the Crooked Lane,
And all round the Square."

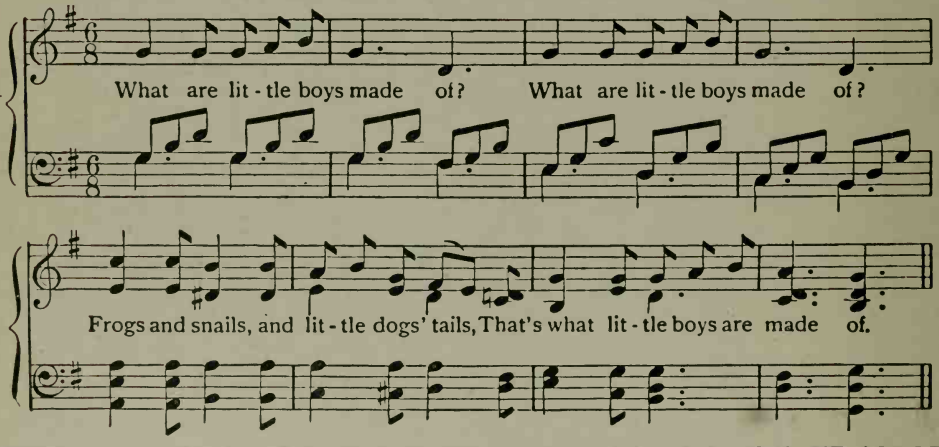
I boxed his little saucy ears,
And then away I strode;
But, since, I've found, that weary path
Is quite a common road.
Utopia is a pleasant place,
But how shall I get there?
"Straight down the Crooked Lane
And all round the Square."

I've read about a Fairy Land,
In some romantic tale,
Where dwarfs, if good, are sure to thrive,
And wicked giants fail.
My wish is great, my shoes are strong,
But how shall I get there?
"Straight down the Crooked Lane,
And all round the Square."

I've heard about a pleasant land,
Where omelettes grow on trees,
And roasted pigs run, crying out,
"Come, eat me, if you please!"
My appetite is rather keen,
But how shall I get there?
"Straight down the Crooked Lane,
And all round the Square."

They say there is a garden fair,
That's haunted by the dove,
Where love of gold doth ne'er eclipse
The golden light of love.
The place must be a paradise,
But how shall I get there?
"Straight down the Crooked Lane,
And all round the Square."

WHAT ARE LITTLE BOYS MADE OF?

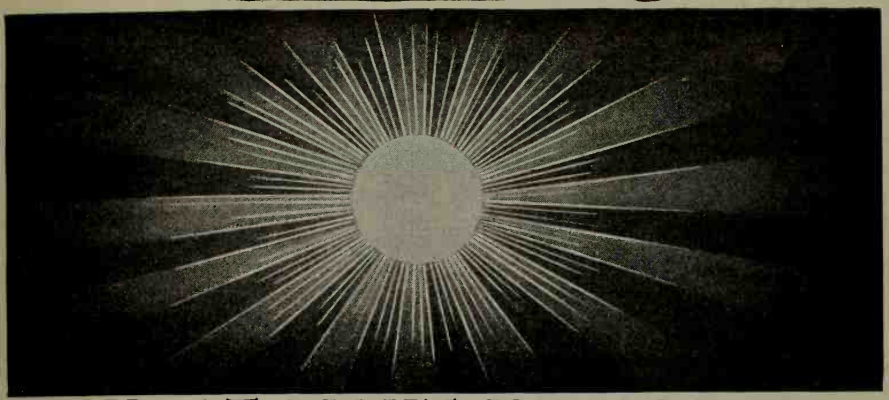

What are lit - tle boys made of? What are lit - tle boys made of?
Frogs and snails, and lit - tle dogs' tails, That's what lit - tle boys are made of.

A NURSERY RHYME OF THE CHILDREN OF FRANCE

The French and English versions of this Rhyme are side by side.

SUR le pont d'Avignon,
L'on y danse, l'on y danse;
Sur le pont d'Avignon,
L'on y danse tout en rond.
Les beaux messieurs font comm' ça,
Et puis encore comm' ça.
Sur le pont d'Avignon,
L'on y danse, l'on y danse;
Sur le pont d'Avignon
L'on y danse tout en rond.
Les belles dames font comm' ça
Et puis encore comm' ça;
Sur le pont d'Avignon
Tout le monde y danse en rond!

ON the bridge of Avignon,
See them dance, see them dance!
On the bridge of Avignon,
They trip around, retire, advance:
Gallant swains bend low, like this,
And once again do so, like this.
On the bridge of Avignon,
See them dance, see them dance!
On the bridge of Avignon,
They trip around, retire, advance.
Fair ladies curtsey low, like this,
And once again do so, like this.
See them dance, see them dance,
On the bridge of Avignon.



WHAT LIGHT IS MADE OF

CONTINUED FROM 5062

WE read these words by means of something that is reflected from the paper to our eyes; and this something is found in all parts of the universe, and is the only means by which we learn about the greatness of the universe. It is called light. It is one of the many forms of power, or energy, and none is more important and interesting.

We know of light by means of our eyes. If we are blind, though there exists something in the outside world which would make light if we could see it, yet that something is not in itself light. This is rather puzzling, yet it is true. In order to have sound—that is to say, something heard—there must be ears. In order to have light—that is to say, something seen—there must be eyes; and if ears or eyes have limits to their power, they are apt to be deceived as to the world outside them.

There are forms of what we should call light, if we could see them, that are outside the limits of our seeing, though some of them can be seen by ants. We must clearly understand this, in the first place; and we must not confuse the study of the something outside us—which, when we see it, we call light—with the study of seeing, or vision. In the ordinary way, we use the word light only for what can be seen by us, and by using the word in this way we may forget some of the facts about light. But the light that we can see is not *all* the light, and it is now the custom of many writers on the subject not to use the word light, but rather to speak of *radiant energy*; for that term covers everything it ought to cover, whether we happen to see it or not. Here, however, we shall use the word light, and there will be no harm done, so long as we clearly understand that what is said applies not only to the light that we are able to see, but to radiant energy of exactly the same kind, but made of slower or more frequent waves, to which our eyes are blind. We know that one of these kinds of light that we cannot see we can feel as heat, and we know that it is called *radiant heat.*

Radiant heat is made of waves in the ether—that wonderful medium which is everywhere, and which, though we think we cannot see it, is yet really the cause of all our seeing, as light consists of waves in it. The laws of radiant heat and of light are therefore the same.

Though light has been studied for many ages, it is only within the last century or so that men have learned enough to make them certain that it consists of waves in the ether, and not of something else; and we must learn that though the wave theory of

light is now known to be true, there was another theory which supposed that light consisted of a number of tiny specks of something flying through space.

We know for certain that light moves, and yet this is a thing which we may very naturally forget. Let us suppose that we are out in the open air on a bright day, or that we are in a room illuminated by a steady light; or take the simple case before us at the present moment and the place as we are reading this page. It seems to us that there is something which we call light illuminating this page, and which simply stays where it is. But this is not at all what really happens.

THE LIGHT THAT FLASHES ACROSS A MILLION MILES IN SIX SECONDS

All light everywhere is in movement, the most rapid movement in the universe. The light is pouring down from the sky, in at the window, or from the lamp, and up from the page to our eyes, as certainly as if it consisted of raindrops, but with vastly greater speed.

The first fact to learn is that there is something moving which makes light. This movement has been studied in various ways, and the rate of it has been found out. It is the same as the rate at which radiant heat, and also electric waves, move, for light is a kind of electric wave. This rate is about 186,000 miles in every second, or a million miles in less than six seconds. So far as we have been able to find out, this rate never changes; it is true for all kinds of light and it is the highest speed that can exist in the universe.

Now, there are many kinds of movement, as we know, and this movement of light might be a movement of something that traveled from place to place, or it might be a wave movement which we could compare to the waves of water. When we throw a stone in a pond, the ripples run along the surface of the water, but it is not, of course, the surface of the water itself that runs.

A SERIOUS MISTAKE THAT SIR ISAAC NEWTON MADE ABOUT LIGHT

The greatest of all the students of light, since time began, was Sir Isaac Newton, the discoverer of the law of gravitation, and of the laws of motion. But though this is true, and though if it had not been for Newton we could not know what we now do, it is an interesting fact in the history of knowledge that Newton was wrong, and the mistake he made was most unfortunate. So far as he could judge, light did not consist of waves, but of tiny particles of something or other shooting through the air. In the study of such matters as these, there never was a mind quite so great, perhaps as Newton's; and it is worth knowing that even the greatest of men may make mistakes, and when great men make mistakes, then the consequences are very serious. Newton had found out more about light than all who had gone before him, and this naturally lent his opinions great authority.

If light consisted, as Newton supposed, of a sort of rain or hail of tiny bullets flying through space in all directions at tremendous speeds, these little flying balls would push and press against anything they struck. Now, the latest of the great discoveries made about light is that it has a pressure. That is not to say, however, that it does consist of a rain of bullets after all, but that, though it consists of waves, and though no material thing is moving when light flies, yet these waves have a pressure.

A FAMOUS MAN WHO COULD STUDY THINGS THAT WERE NOT YET DISCOVERED

How interested Newton would have been to have learned this! This pressure is true not only of light in the strict sense of the word—that is to say, the waves that we can see—but it is true of the other waves, rays or radiations that we cannot see; and the proper name for it is *radiation pressure.*

A famous Scotsman, named Clerk-Maxwell, declared, many years ago, that light must have a pressure, and stated how much that pressure must be. This he did by means of sheer thinking-power, and because he had a true understanding of the nature of light waves. Within the present century students have independently proved that light has a pressure, and the force of it is just what Clerk-Maxwell foretold.

When very careful and delicate experiments are made, and something that weighs very light is delicately hung by a slender thread made of quartz, so that the tiniest touch will push it, we find that it is pushed when a ray of light is allowed to hit it; and the force of the push can be measured, and proves to be exactly what it ought to be to agree with our

theory of light waves. It is very wonderful to see this experiment, and to see something pushed as if a finger or a jet of water had struck it, though we know that no *thing* has struck it, but only the motion of a force in the ether. We should remember the name of radiation pressure; for it is certain that every year we shall hear more about this subject.

A HOLE IN A SHUTTER THAT REVEALED THE MYSTERY OF THE UNIVERSE

Light is one of the greatest facts in the universe; and it is, therefore, one of the greatest facts of Nature that light, wherever it flies, has a pushing power. Here is a force at work, almost as universal as gravitation, which acts in just the opposite direction, pushing instead of pulling. It is probable that the meaning and consequences of this pressure for the future of the universe are all-important, and we cannot help wondering what the mind of the discoverer of gravitation would have found out if he had known about radiation pressure.

The most famous of all Newton's experiments, like the most famous experiments in all ages, were perfectly simple, and cost scarcely anything to make. All that Newton did was to close his shutters, bore a hole in one that let a ray of light through into the darkened room, and then to take a prism—that is to say, a three-sided piece of glass—and see what happened when the ray of light passed through it. He found that the ray of white sunlight was broken up into many colors. When in place of a hole he made a slit in his shutter, and let the light pass through the prism, he found that the white light was broken up into a band of colors, which were the colors of the rainbow. This band of colors is now called the *spectrum*, and by it many mysteries of the universe have been revealed to scientists.

THE RAINDROPS THAT BREAK UP THE LIGHT AND MAKE THE RAINBOW

This experiment proved once and for all what could never have been guessed or believed, that the ordinary white light we know so well is a mixture of colors, and those colors are the colors of the rainbow. The rainbow itself is made out of white light, because the white sunlight is broken up into the colors that make it by being reflected from countless raindrops in the sky. These raindrops act just as Newton's prism acted, and for the same reason. This great discovery of the compound nature of white light, as it is called, marks the real beginning of this part of science.

Newton, of course, went very carefully into the matter; he understood what happened, and why it happened. He saw that when the light passes through the prism it is bent. We know quite well how rays of light can be bent. As long as nothing bends them they travel in absolutely straight lines, but when they pass from air into water or water into air, or air into glass or glass into air, or in any other case, they are bent; so they come out from the prism at a different angle.

If that was all, the consequences would simply be that the ray of white light, instead of striking the wall just opposite the hole, as it would have done if the prism were not there, would strike it somewhere else, because the prism had turned its course. But just because the white light is not a single thing, but is a mixture of all the colors of the rainbow, something else happens.

THE LITTLE BIT OF GLASS THAT SORTS OUT THE COLORS IN THE SUNBEAM

The rays of light that make these different colors all differ from each other in the extent to which they are bent. The red rays, as Newton found, are the least bent, and the violet rays are the most bent. The consequence is that the light which went into the prism all mixed leaves it all sorted out, the red rays being least bent from the course they would have taken if the prism had not been there, the violet rays being the most bent, and the others taking their places in between.

Not only did Newton discover this, but he laid down the law quite rightly, showing that the colors of light are not the consequence of anything it strikes upon or passes through, but are the natural properties of particular kinds of rays. If a thing is red, that is only because it throws back to our eyes red rays. As he said: "Some rays are disposed to exhibit a red color and no other; some a yellow and no other; some a green and no other; and so of the rest." He saw, also, that there is an absolute law as to the bending of these rays, the same color being always bent to the same degree, no matter where the light comes from.

This simple experiment of Newton's has led to such a vast number of consequences that it would take a book to describe the merest outlines of them. In various parts of the world there are great observatories which are devoted to nothing else but repeating Newton's experiment with sunlight.

THE GREAT MARVEL OF A LITTLE BAND OF COLOR

We already know that the band of color obtained is called a spectrum, and everything seen in this spectrum has to be studied and noted and described and measured; we have to analyse the spectrum as we would analyse a mixture of chemicals in a glass vessel. This subject is known as *spectrum analysis*.

Spectrum analysis has to be applied not only to sunlight, but to the light from the moon and Mars, and the other planets; it has to be applied to the light from the stars and comets and nebulæ. We have to study the light given out by hot metals and minerals, and by every kind of lamp, or anything else that gives out light at all. In various ways we can study even the invisible part of the spectrum, the rays beyond the violet and below the red. With those beyond the violet we can take photographs, and we find that those below the red convey heat. We read about the spectrum on pages 2738 and 2741.

In every part of the spectrum we find certain dark lines. Newton missed them, but they are almost more important and interesting than the spectrum itself. Every one of these lines tells us something about the material that the light is coming from. It follows by Newton's experiment that we can tell what kinds of atoms are giving forth light in the sun.

HOW A PIECE OF GLASS CAN TELL US WHAT THE STARS ARE MADE OF

An analysis of the spectrum obtained by means of the prism teaches us of what elements the sun and the stars and other heavenly bodies are composed. It proves to us that there are oxygen and water in the air of Mars; it helps us to tell one element from another; to discover in one element the presence of smaller quantities of another element that we can detect by no other means; it even enables us to tell whether stars are moving towards us or from us in the very line of our sight, and at what rate they are doing so. It was not really until the nineteenth century that the wave theory of light was established; and as we read all about sound in this book, it is worth knowing that it is the resemblance between sound and light which led the great Englishman, Dr. Thomas Young, to ask whether, notwithstanding Newton, light must not also consist of waves, as sound does. Young made the remarkable discovery that, under certain conditions, light added to light will produce darkness, because the waves of the one interfere with the waves of the other, as may happen with sound waves, and as we see when water waves are reflected from a breakwater. It was impossible to have any theory of light except that it is made of waves, once this fact of interference was known.

Now, here we have not only a proof of the wave theory, but also a very interesting explanation of a certain difference between light and sound.

WHY A RAY OF LIGHT WILL NOT SPREAD OUT AND FILL A ROOM

If we let in a beam of light through a hole, it certainly spreads out as it travels, but it does not at all behave as sound would. Sound would spread out equally in all directions, just as the light does from a candle standing in the middle of a room. But why does a ray of light remain narrow and not spread out sideways, so that the ray of light does not fill a whole room as sound coming through a hole would?

The answer is that the waves going sideways from a ray of light almost entirely interfere with each other. As we have seen, this interference cannot be explained unless light does indeed consist of waves. This discovery was made by a Frenchman, and Clerk-Maxwell, whose name we have already mentioned, continued the study of light in Great Britain, which has so much to boast of in this connection, and proved for ever that light consists of electric waves passing through the ether.

Now we must study a little the nature of these waves. In the first place, we must remember that, totally unlike the waves of sound, but exactly like the waves of wireless telegraphy, these waves travel in, and are made by, the ether. Ordinary matter, such as air or water or glass, may be there, too, and

may affect the light in one way or another; some kinds of matter, as we know perfectly well, will stop it altogether, and is said to be opaque. But wherever the light is, whether shining through water or traveling in space from star to star, where there is no matter at all, the waves are always in the ether, and in nothing else.

The ether, the "light-bearing ether," as it is sometimes called, is absolutely everywhere, whether matter is there or not, and light traveling through the air to our eyes is in the ether just as much as if the air were not there at all. The ether waves may be bent by matter, as we see when light passes through glass; they may be reflected by matter as we see in a mirror; they may be absorbed—sucked up, as it were—by matter, as when light shines on a dull, black surface; they may often be delayed in passing through matter; but, nevertheless, the waves are always in the ether.

How we see the light of the sun by night

But that is very far from stating the whole of what is to be said about the way in which matter affects these waves; for though they are ether waves, matter starts them, and nothing else starts them. All the light in the world comes from matter that is giving forth light. *Lumen* is one of the Latin words for light, and matter that is giving forth light we call luminous.

The flame of a candle consists of luminous gases; the thread of an electric lamp conists of luminous solid matter; the sun, the stars, and all other things that give light from themselves consist of luminous matter. Yet the things we see are not only the things that are luminous, for we see many things by light which they did not make, but which they reflect. Thus we see the moon, which is not luminous, by light reflected from the luminous sun; and we see this page by light reflected either from the luminous sun or from luminous matter of some other kind.

We must think of all matter as made up of atoms deeply buried or surrounded on all sides by the ether. Now think of a fish under the water moving its tail. If we are watching we may see ripples—that is to say, waves made in the water by the movement of the fish's tail. All matter everywhere—the sun, or the gases in a candle, or anything else—is as if it were surrounded by a great ocean, which is the ether. And so if the atoms of matter are acting in the same manner as the fish does when it moves its tail, they may set up waves in the ether just as the fish does in the water; and that is exactly what happens whenever and wherever matter is luminous.

A moving ball that makes sound and its moving atoms that make light

We are right to think of the matter in this case as made of atoms. It is the atoms themselves that are the source of the light. A ball of iron might be set trembling, or vibrating, and in this way might cause waves in the air which we should call sound; but no possible movement of the ball as a whole would cause light. If, however, we heat the ball, without moving it at all, something happens to the atoms of it, and they start moving in their own way, setting up ether waves, which we call light. If the ball is only fairly hot, the particular kind of waves will be what we call red light; but if the ball becomes much hotter, it is then what we call white hot, for now its atoms produce that mixture of waves which we call white light.

Nevertheless, if the atoms are giving off light at all, that light, when carefully examined—as Newton examined the ray of sunlight with his prism—will always tell us positively that it was made by iron. If the ball is not pure, and besides the atoms of iron there are atoms of other elements, these atoms will contribute waves special to themselves to the light of the whole; and when the light is analysed we may be able to say there are atoms of magnesium and calcium there as well as atoms of iron.

How we can see the iron in a star millions of miles away

We can do this equally well, whether we are studying the light from a hot wire in our room, or whether we are studying light which left a star many hundreds of years ago; and we can say, in a true sense, that we *see* atoms of iron in that wire that is only a foot away, or in a star so far away that none of us can imagine its distance. Yet there is the evidence that such and such atoms, and no others, are giving forth light in that star; or, rather, were giving forth light

from it hundreds of years ago when the light which has now reached us left the star. The star may long ago have been smashed into dust and disappeared. We cannot say of any star we see in the sky at this moment that it is now there; we can only say of the nearest we know that about four and a half years ago it was certainly there.

EVERY KIND OF SUBSTANCE GIVES OUT ITS SPECIAL KIND OF LIGHT

It is a tremendous fact that every kind of atom known to chemists should be so specially different from all other kinds of atoms that it gives off light of a special kind. It is very interesting, also, to study the different kinds of light given out by different atoms when they are made luminous. These different kinds of light are called the *spectra* of the various atoms or elements. Thus there is a spectrum of iron, a spectrum of oxygen, and so on.

We also have to study how these spectra change according to the heat of the atoms that produce the light; and all this study is specially important, not only because it teaches us the chemistry of so many things, including the stars, but also because it is one of the great tests for an element.

If something that we know nothing about looks like an element, we must always find out whether it has a spectrum of its own different from any other. If it gives off light different from any other light known to us, then it must be made of atoms different from any others that we know—that is to say, it must truly be a new element. But often we find that the thing really gives off a light which tells us that it is only a mixture of two other kinds of elements that we were aware of already.

THE MARVELOUS ENERGY ALWAYS GOING ON IN THE AIR TO MAKE LIGHT

The next great fact we must remember is that it is impossible to get something from nothing. Light is not a "thing" in the sense that it can be handled or chopped up, but it is, nevertheless, a great reality; it is a form of power, or energy, constantly being hurled through the air from the atoms of matter that are luminous. These atoms we must imagine to be vibrating at tremendous rates, and just as this vibration produces the kind of radiations we call heat, so also it produces the similar kind of radiations we call light. But all the while the atoms are doing this they are spending power; and if anyone spends without replenishing that which is spent, in time he or she will become bankrupt.

Once we grasp the fact that the making of light is spending, we realize how it is that if we are to get the kind of power called light from anything, we must put some kind of power into it. We run electrical power into a wire, and so we get light; we take the chemical power of carbon and oxygen in a candle, and so we get light; we can burn oxygen and hydrogen and thereby produce a great deal of heat which makes a piece of lime very hot, and so we get limelight.

But in no case do we get power unless we give it. Every luminous atom in the universe is cooling down, and in exact proportion as it is giving heat and light it is losing energy, and will in the long run become cold and dark unless it gets new energy from somewhere. This is true even of radium, which makes radiant heat and certain kinds of light also, from inside itself. Its atoms must break down to do this, and must turn into simpler kinds of atoms which contain less energy, or power.

WHY THE EARTH MUST DIE IF THE SUN'S LIGHT GOES OUT

The importance of this is not merely that we have to pay for our light every month—as light cannot be made for nothing—but that the great luminous bodies in the sky are subject to the same laws as the head of a glowing match, which soon dies out and turns cold. This more especially concerns us as regards our own sun. It is from the sun that we on the earth get heat and light. His rays striking our world mean health and life and gladness for humanity. But the sun is cooling down, and when the sun grows cold all life upon the earth must die, as must all life present or to come upon any of the sun's planets. The making of light is the spending of power; the sun is spending power, and if that power is not replenished, it must therefore be cooling.

The sun, therefore, must one day become cold and dark, as countless other stars in the sky are, and as all the bright ones must become at some time.

THE NEXT PART OF THIS IS ON PAGE 5241.

A STORY OF FOUR SISTERS

THIS is one of the most delightful of the many stories for boys and girls which have ever been written. The author was a lady named Louisa May Alcott, who was born at Germantown, Philadelphia, in 1832. Her father was deeply interested in education and philosophy, but was very poor. The family knew the pinch of poverty, yet always contrived to keep bright and hopeful. Miss Alcott had three sisters, and their characters are all sketched for us in this story. Meg, Amy, and Beth are only fictitious names for them, and in the character of Jo we see Miss Alcott herself. Mr. and Mrs. March are based upon her own father and mother, and other personages in the story are taken from real life, as well as many of the incidents described. The book appeared originally in two parts, "Little Women" being the first, and "Good Wives" the second part, but they are often printed together as one tale. Miss Alcott died at Concord in 1888.

LITTLE WOMEN & GOOD WIVES

CONTINUED FROM 5056

IT is in the time of the Civil War, when the southern states were fighting the states of the north over the question of secession, that our story begins. But its scene is a quiet little village of New England, not far from Boston, where only faint echoes of the war are heard.

Tucked away in a quaint old-fashioned house here were four sisters, named Meg, Jo, Beth, and Amy, and a happier quartette never shared a home-nest together. Their father, Mr. March, was away, serving as chaplain to one of the regiments of the north, and their mother, a gem among housewives, had hard work to provide for the family. They had very little to live on, but their cheerfulness and courage never failed.

Meg and Jo were the two elder sisters, and they helped their mother by earning a little money. Meg taught young children of a wealthy family, and Jo ran errands and read for her rich aunt, who was a kind-hearted, but rather exacting, old lady. For all their own narrow means, the sisters contrived to do little acts of kindness to the poorer people in their neighborhood, and perhaps that was one of the reasons why they were always so bright and cheerful, as there is no satisfaction like that which comes from doing service to others.

A new companion came into the little circle of the Marches when old Mr. Laurence and his grandson Theodore came home to live in the big house next door. Theodore was a dark, handsome boy of foreign appearance. His mother had been an Italian lady, whom Mr. Laurence's son had married against his father's wish. Theodore was now an orphan, and heir to his grandfather's wealth. The home of the Laurences was richly furnished, but that was nothing to the lonely boy who lived there with the old man, until the merry girls from next door brought laughter and sunshine into it.

Jo was Laurie's greatest chum, for she was something of a boy herself, athletic and prankish, and yet fond of books and reading. He confessed to her that he wanted to be called Laurie, as he was afraid the boys might think his proper name rather "girly," and might be tempted to christen him Dora!

In that snowy winter when this new friendship began, there were constant comings and goings between the two houses. The girls got up the most exciting plays, of which Jo was the author, and Beth supplied the music, and in these Laurie took his part. They had an amateur magazine, "The Pickwick Portfolio," the organ of the Pickwick Club, of which all were members, and each was known by the name of one of the characters in Dickens's story.

But perhaps best of all was their post-office, which maintained a regular service between the two houses, and through which, in the years that were to come, many a love-letter passed from one house to the other. Of the girls, Beth was the shyest and most retiring, a real home-bird, but her sweet and gentle nature had considerable influence upon her sisters. If there was a touch of vanity in any of them, Amy, the youngest, had it, but for all that she was as bright and lovable as any. Beth stayed at home and helped in the housework, with their old servant Hannah, and Amy went to school.

WHY AMY WAS TAKEN AWAY FROM SCHOOL, AND HER MOTHER'S ADVICE

Now, the children of New England in those days had a fondness for pickled limes, and liked to bring these to eat in school hours, which was a great offence —and Amy greatly offended. The teacher punished her severely for this and her mother took her away from his school, because she did not like his way of teaching.

"That's good! I wish all the girls would leave, and spoil his old school. It's perfectly maddening to think of those lovely limes," sighed Amy, with the air of a martyr.

"I'm not sorry you lost them, for you broke the rules and deserved some punishment for disobedience, although I should not have chosen that way of mending a fault," was the mother's severe reply, which rather astonished the young lady, who expected nothing but sympathy. "You are getting to be rather conceited, my dear, and it is quite time you set about correcting it. You have many little gifts and virtues, but the great charm of all power is modesty."

"So it is!" cried Laurie, who was playing chess in a corner with Jo.

MEG GOES TO TOWN AND HAS A TASTE OF FASHIONABLE LIFE

It was not long after this that Meg received an invitation to visit her old school friend, Annie Moffat, and as the Moffats were wealthy people who enjoyed the fashionable life of the great city where their home was, there was a great deal of preparation for Meg's two weeks with them. As each of her sisters helped to fit her out, and her own good looks made even the simplest clothes seem dainty, Meg was much admired at the parties which the Moffats gave.

Laurie also received an invitation to one of these parties, and Meg behaved rather badly to him, perhaps because she found herself the centre of so much interest among the Moffats' friends; perhaps, also, because she heard it whispered there that Mrs. March was trying to make a match between her and Laurie. When she "'fessed" this at home on her return, Jo and her mother were indignant.

"Well, if that isn't the greatest rubbish I've ever heard!" cried Jo. "Just wait till *I* see Annie Moffat, and I'll show you how to settle such ridiculous stuff. The idea of having 'plans' and being kind to Laurie, because he's rich, and may marry us by-and-by!"

"But, mother, *do* you have 'plans,' as Mrs. Moffat said?" asked Meg.

"Yes, my dear, I have a great many; all mothers do, but perhaps mine differ from Mrs. Moffat's. I want my daughters to be beautiful, accomplished, and good; to be admired, loved, and respected; to have a happy youth, to be well and wisely married; and to lead useful, pleasant lives, with as little care and sorrow to try them as God sees fit to send.

A GOOD MOTHER'S PLANS FOR HER DAUGHTERS' FUTURE HAPPINESS

"To be loved and chosen by a good man is the best and sweetest thing which can happen to a woman. But I'd rather see you poor men's wives, if you were happy, than queens on thrones, without self-respect and peace."

Meg's little journey into Vanity Fair, represented by this fortnight amid the fashionable life of the city, had not been without its use in showing her the silliness of the gossip people talked in "fashionable circles," and only made her love her simple home-life more than she had ever done before.

Time slipped away in this pleasant companionship, and the girls grew into young women for whom the good fortune their mother had wished was perhaps near at hand. Jo's amateur contributions to "The Pickwick Portfolio" had made her ambitious to appear in real journals, and when one day she had news that two of her stories were accepted, her delight knew no bounds. Laurie was as proud when he heard of it as if he had written the stories himself. And it was he who then let her into a secret when he said he more than suspected Mr.

Brooke, his tutor, was in love with Meg, for he had seen one of Meg's old gloves in Mr. Brooke's pocket. But the idea of anyone coming to take Meg away did not please Jo. "I'd like to see anyone try it!" she said fiercely.

One November day a telegram was received stating that Mr. March was in hospital at Washington and asking Mrs. March to come at once. It was as though the grey November sky had suddenly turned black indeed. All the girls were busied at once helping the mother with her preparations to leave that evening; but Jo disappeared mysteriously, and Laurie went in search of her. When she came back she was proud to hand her mother twenty-five dollars to add to the little sum of money Mrs. March possessed for the expenses she was now to meet. How had Jo managed to get this useful addition? By the simple process of selling her beautiful tresses, for she now appeared before them with her hair cut short.

DARK DAYS ARE FOLLOWED BY THE JOY OF FATHER'S HOME-COMING

These were indeed dark days, for though news came at length that the father was recovering, poor Beth was stricken with scarlet fever, which she had contracted from the child of a poor woman in the village to whom the girls were always rendering some little service. Jo had no time now for her poems and stories. Frolics were all forgotten in her devotion to her sister, whom she nursed so tenderly and so well that when Mrs. March came home with the good news that father was rapidly improving, Beth was already convalescent.

Christmastide had come round once more, and they all felt that if only their father were strong enough to be with them, nothing would be lacking to make it the merriest season they had known. But on Christmas night Laurie came in with such an air of delight and suppressed excitement that they all felt he was the herald of good news. And in a moment more, while they waited for Laurie to speak, in came Mr. Brooke supporting Mr. March himself, who walked smiling into the room. Four loving pairs of arms were round him in an instant, and Jo, in her excitement, almost fainted, while the dignified Amy fell over a stool and did not even endeavor to get up, but hugged her father round his legs, and quite by accident Mr. Brooke kissed Meg; and Beth, in her little red wrapper, ran out from her room straight into Mr. March's arms, strong again in the joy of her father's return.

SOMEBODY COMES TO STEAL MEG AWAY FROM HER LOVING SISTERS

It was soon after this that Mr. Brooke proved the truth of Laurie's suspicion, and much to Aunt March's disgust—for the old lady wished to see her nieces marry wealthy men—Mr. and Mrs. March agreed that Meg should become Mrs. Brooke in three years' time, when she would be twenty. Before that happy day came round, John Brooke had taken his share in the war, and had been wounded in the good cause; but the war was now over and he was back in the little town again, working hard to prepare the home for Meg.

The years had made Amy beautiful, while Beth was still the sweet, shy creature she had ever been; and Jo, as boyish as ever, was still dreaming of authorship and doing, too, for other things she had written were finding acceptance at the hands of real editors. Mr. March had settled down to his own work at home, and though his wife's hair was greyer than before, she was still strong and happy. Laurie, away at college, was still the fast friend of this little household.

To the last her parents and her sisters seemed loath to let Meg leave the old nest; but her marriage made hardly any difference, as she came and went in her mother's house almost as when she had been a girl.

THE GREAT DAY WHEN JO WON A PRIZE FOR ONE OF HER STORIES

It was a great day for Jo, when, having won a hundred-dollar prize for a story, she was able to send her mother and Beth, who seemed to grow paler as the days went by, for a month at the seaside.

Jo also wrote a novel which was moderately successful, and the three hundred dollars she got for it made her feel quite wealthy. Her great longing was to visit Europe, and see something of the life of those famous cities she had read so much about. But Amy was the one to whom that good fortune came. Aunt March furnished the money to send her favorite niece abroad with another relative, who was to make a tour in Europe. Jo, however, concealed

her own disappointment, and worked loyally in helping Amy to prepare for her long journey.

Now, all this time Laurie had been such friends with all the girls that, when Jo had spoken of the possibility of his "marrying us," she meant that there was none of them he seemed to care for more than the others.

WHY JO WENT AWAY, AND SOMETHING ABOUT A PROFESSOR

But of late she had felt that this friendship for herself was deepening into love, and she made up her mind that that was not to be, as she half suspected Beth was in love with him. And that was why Jo suddenly betook herself to New York for a time.

Before long she was writing home about the good and gentle Professor Bhaer, from whom she was receiving tuition in German. It was clear that the professor was very much in Jo's thoughts. That was one of the reasons, but not the only one, for her declining to be the wife of Laurie when that dearest friend, who had now graduated with honors from his college, put the tender question to her one summer day after she had returned to her home.

Old Mr. Laurence now determined on a visit to Europe, and Laurie went away with him. In Laurie's travels he met Amy in the south of France, and was filled with pleasure to find how beautiful and how womanly she had grown. He had thought that Jo's refusal of him would leave him with a wounded heart for years, but somehow in the presence of Amy the wound seemed quickly to heal.

LAURIE AND AMY, AND A PRETTY SCENE ON THE LAKE OF GENEVA

Before long he discovered, to his own surprise, that Amy was the sister whom he loved. One day, when they were rowing on the Lake of Geneva, whither he had followed her, Amy took an oar, and together they kept time as the boat went smoothly through the water. Neither of them spoke for a little.

"How well we pull together, don't we?" said Amy, who objected to silence just then.

"So well that I wish we might always pull in the same boat. Will you, Amy?" —very tenderly.

"Yes, Laurie," she answered, very low. Then they both stopped rowing, and unconsciously added a pretty little picture of human love and happiness to the dissolving views reflected in the lake.

Meanwhile, away at the old home in New England Jo was very lonely; but she worked hard at her writing, and busied herself in household affairs to help the slow months along. Then one day came a new burst of happiness, when Laurie and Amy arrived—already married! Jo and Laurie were really better friends than ever, for the unselfish elder sister found a new joy in Amy's happiness. But Professor Bhaer was becoming quite a frequent visitor at the home, and it was noticed that Jo had a habit of blushing when he entered, or even when his name was mentioned.

This being so, in due course it was no great surprise to all who were interested to know that the good professor had seized an opportunity one rainy day, when he and Jo had to share the same umbrella, to ask her if she loved him well enough to have him for her husband, whose heart was full of love even if his hands were empty. And, putting her hand in his, for she dearly loved a jest, she answered: "Not empty now," and kissed the professor under the umbrella.

THE HAPPY DAYS FOR ALL AT THE HOME OF "MOTHER BHAER"

It was more than a year afterwards that Aunt March died and left Jo her country house. This gave her and her sweetheart the happy idea of founding a boys' school, where she was to reign over a regiment of boys as "Mother Bhaer." It never was a fashionable school, and the professor did not lay up a fortune; but it was just what Jo intended it to be—"a happy, homelike place for boys who needed teaching, care, and kindness." And in the years that followed, during many a happy holiday, the sisters, with their husbands and their children and Mr. and Mrs. March, the happiest of grandparents, gathered there in loving companionship to talk over the days that had been, recalling the tender memories of their own childhood. On these occasions a toast that was always honored was "Aunt March, God bless her!" For the professor could never forget how much happiness he owed to that crotchety old lady with the kind heart.

THE NEXT FAMOUS BOOKS ARE ON PAGE 5257.

Here is a collection of curious old watches. The watch at the top right-hand corner belonged to Oliver Cromwell, and underneath it is a watch fitted to a ring that was once George the Third's.

WHAT MAKES A WATCH GO?

CONTINUED FROM 5026

THE great law about power and energy, to which we so often have referred, gives us the answer to this question. There is power in the spring, which gradually communicates itself to the wheels of the watch, turning them, and making them move the hands that we see. After a time, perhaps twenty-four hours, or even longer, the watch stops, because the power of the spring has come to an end. It has spent itself in moving wheels, in moving the hands of the watch, in overcoming the friction at the places where the wheels and the hands are balanced, or pivoted, and in moving the air in the watch and overcoming its resistance.

As no power can come from nothing, every imaginable kind of watch or clock must, sooner or later, have fresh power put into it.

The power was put into the spring when the watch was wound up. We wound it with our muscles, spending force obtained from food, which, in its turn obtained the force from the sun. So the sun really drives the watch. When we wind a watch, we feel that we are pressing against something. If it has quite run down, the first turn causes little effort to our fingers, but the last turns need more. What we are doing is simply coiling a spring tightly. It uncoils itself in a regular way, with the help of what is called a balance-spring, and so gives to the wheels of the watch the power we put into it. We can only say that when the spring is bent there is something in the strained arrangement of its parts which is the equivalent of power, and which can be transformed into power.

WHAT KEEPS A CANNON-BALL FROM FALLING TO THE GROUND?

Not only does the cannon-ball not fall to the ground at once when fired, but it always travels in a curve of a certain kind, and all things travel along paths of this particular kind when they are thrown forward.

The path taken is the result of the working together of all the forces that act on, or in, the ball. If the ball were simply allowed to roll from the mouth of the gun, it would fall at once to the ground, for the only force then acting upon it to any extent would be the pull of the earth.

But when the ball is shot from the cannon, it leaves the cannon in a certain direction and with a certain amount of force, and though Newton's law of gravitation says that the earth is pulling the ball, his first law of motion says that every moving thing tends to move onwards in the

same straight line at the same speed for ever. The actual path of the cannon-ball is the result of the acting together of these two forces. Sooner or later gravitation gets the upper hand, especially as the resistance of the air helps it; but for every moving thing—a cannon-ball, or an atom of gas in the air, or anything else—there is a certain speed at which it would leave the earth altogether.

WHY DOES IT TAKE MORE POWER TO STOP A TRAIN THAN TO START IT?

We might extend this question by asking why it takes more power to stop the train if it is moving very quickly than if it is moving slowly. We find, indeed, that the power required to stop the train depends on the mass of the train, and on its speed. The greater these are, the greater is the power in the train, and the greater will be the power that is required to stop it, for this must be exactly equal to the power in the train.

When a train is at rest, the power required to start it depends simply on the weight, or, to use the best word, the mass, of the train. We all know that it takes more effort to move a heavy thing than a light one. We know, too, that it is one matter to let a heavy thing rest on the foot, and another matter to let it fall on the foot; and the greater the height from which it falls, the more it hurts. That is because the greater the height from which it falls, the faster it is moving when it strikes the foot.

Such a case teaches us that movement adds power to anything; and that is so, for movement is itself a form of power. More than that, the greater the weight of the moving mass, the greater is the power that was required to move it, and therefore the greater is the power required to stop it.

HOW DOES SEAWEED TELL US WHAT THE WEATHER IS GOING TO BE?

Of course, seaweed does not foretell the state of the weather in any direct way; it merely tells us something which gives us some guidance as to the weather. A barometer, also, does not tell us about the weather itself, but, like the seaweed, it indicates something that has to do with the weather. As the barometer and the seaweed tell us different things, we should perhaps be able to know more about what the weather was likely to be if we used them both, and then noticed what usually happened when they did certain things. The barometer simply tells us how heavy the air is at any given time, and from that fact we can make certain guesses, more or less likely to be right, as to what will happen. The barometer tells us nothing else at all, even though we often call it a weather-glass.

The seaweed tells us nothing about the pressure, or heaviness, of the air at any given time, but it tells us about the moisture of the air and about that only; or perhaps, in a way, it also tells us a little about the warmth of the air, though we can feel that for ourselves.

When a piece of seaweed feels very damp, it tells us that there is a good deal of moisture in the air, and rather more than the air can well carry, so that it is glad to unburden itself into the seaweed as far as possible. Now, that means that the air may very likely unburden itself soon on a bigger scale by means of rain. When the seaweed is dry, it means the opposite of this.

IS IT A SIGN OF RAIN WHEN THE SMOKE IS BLOWN DOWN THE CHIMNEY?

It may be, or it may not be. If we think about this question for ourselves, we shall see that no one could answer simply Yes or No to it, for so many different things come into it. The traveling of smoke up a chimney and of wind down it are complicated matters.

We may be sure that when the wind blows down the chimney the air is not still, and wind very often brings rain, for wind is moving air, and this air may be laden with moisture, which is likely to fall as rain.

But though wind and rain often go together, so that rain is more likely to fall when the smoke is blown down the chimney, yet there are winds which are usually dry, and bring no rain with them. Different chimneys smoke with different winds, and some smoke with all winds, and some with none; so, plainly, it is impossible to answer this question, except in a general way.

WHY DO THE TREES NOT DIE IN WINTER LIKE THE FLOWERS?

This question depends upon a mistake as to the nature of trees and flowers. A flower is only part of a plant; it is a special part, or organ, made by the plant for a special purpose, which is the

production of seeds to produce new plants. We must not speak of the flower as if it were a plant. It happens to be conspicuous because the help of insects is required in the production of seeds, and the flower is a flag made to attract the insect's attention. But there are many flowers which do not require the help of insects. These flowers need not be conspicuous. All trees have flowers, and in most cases they are of the inconspicuous kind.

Once, however, we know that trees have flowers, we do not need to be told that these flowers die in the winter, just like the flowers of other plants. But the plant or tree does not die because the flower dies. The tree goes on living, and will produce new flowers next year; and that fact may also be true of many of the smaller kinds of plants.

HOW DEEP IS THE DEEPEST PART OF THE SEA?

The Pacific Ocean is now believed to be deeper, on the whole, than any other sea, and the average depth of the greater part of it is said to be about two thousand five hundred fathoms. A fathom is six feet, so we can easily calculate this for ourselves in yards or miles, as we please.

But far greater depths than this have been recorded within recent years, not to mention cases where bottom has not been touched even at very great depths. It is probable, and easy to remember, that the very greatest depths of the sea correspond to about the greatest heights of the mountains on land, and we may put down such distances as five or six miles as roughly representing what we may believe to be the very greatest depths of the sea.

The very interesting question we must ask is: How near do such depths go toward piercing right through the earth's crust? The answer is that these abysses can only represent places where the earth's crust is, say, one-eighth less thick than it is elsewhere.

HOW DO MEN FIND OUT THE DEPTH OF THE SEA?

The simplest plan is by letting down a weighted vessel by a rope, marked off at intervals, and when it is felt that the vessel has touched the bottom, it is pulled up again to see what has got into it.

But this will do only for very shallow depths, comparatively. When it comes to sounding great depths, we must first abandon the rope and use a wire, as was first done by Lord Kelvin. The wire rubs against the water far less than the rope, and when we are dealing with lengths of miles, that is an important matter. Also, when great depths are being sounded, it is hopeless to expect to drag up the weight that has sunk the wire.

So Lieutenant J. M. Brooke of the United States Navy contrived a device that will let the weight go at the bottom, and perhaps some tiny, light vessel can be left at the end of the wire, not too heavy to pull up, which will carry some evidence of the life that exists at the bottom. Sea-sounding is a study that has recently been greatly improved, and it has taught us very much about the strange powers of life under hard conditions.

DO THE PEOPLE AT THE POLES SPIN ROUND LIKE A TOP?

We are now quite certain that no human beings live at either the North or the South Pole, but that does not make the question about the spinning any less interesting. If we think of a spinning top, we shall see that all parts of it move round in the same time, but that different parts are moving at different speeds, for those near the bulgy part of the top—near its "equator"—have farther to go in the same time than those near its "poles."

Now, in the case of the spinning top that we call the earth, it is necessarily true that all parts of it complete a revolution in twenty-four hours. This must apply equally to a man standing beside the North Pole, or a man at the Equator, for the earth moves all in a piece—not like the sun or Jupiter, different parts of which lag behind the others.

The man at the Equator is being whirled along at the rate of about a thousand miles an hour, but a man actually standing on the North or South Pole, on the point of the very axis of the earth, is simply being turned completely round once in twenty-four hours, while his brother at the Equator has been whirled through 25,000 miles. So, though at the Poles people would spin like a top, they would notice nothing, for the spinning would be so slow.

WHY CAN WE SEE IN THE LOOKING-GLASS THINGS THAT ARE NOT IN FRONT OF IT?

We see things in the glass because it

reflects to our eyes the light which first fell upon the objects, and which they then reflected to the glass. This it does according to the great law of the reflection of waves, like those of light. The law is that the angle at which the wave approaches the surface which reflects it is the same as the angle at which the light will leave that surface. This law is strictly followed by all rays of light that strike the mirror, and if our eyes are rightly placed we can catch the rays as they are reflected from the glass to our eyes.

If we think of an indiarubber ball instead of a ray of light, we shall understand this quite easily. Anyone standing far to one side of the mirror might throw a ball at an angle against it, and we know that it would come off the mirror at a corresponding angle. If now, instead of a ball thus reflected, we think of a ray of light, we shall see how it is possible for the mirror to show us things that are not immediately opposite to its surface.

WHY CANNOT WE GRASP A BAR TIGHTLY WHEN WE FIRST WAKE UP?

When we are taken captive by intense laughter, we cannot hold tightly to things, and the same is true in some other states of mind, as when we just wake up. Now, in all cases we know that the necessary muscles are there, as large as ever, and so we may be sure that the explanation is somewhere else.

It might be in the nerves that carry the orders to the muscles, but if we consider what it means to be just wakened, or to be laughing very heartily, we shall agree that the key is to be found in the brain itself, for plainly the brain is in an unusual state in both these cases.

Further, it is the part of the brain concerned with the will that is at fault. During sleep the willing parts of the brain are at rest, and are only very scantily supplied with blood. Not until we are wholly awake do the centres for will get into action, and till then our voluntary acts are feeble, though acts not under the will, such as the beating of the heart, go on as well as ever.

In intense laughter the centres of will are starved of energy, which is being drained away very quickly in expressing our feelings. That is why intense laughter leaves us exhausted.

WHY DO OUR EYES SPARKLE WHEN WE ARE MERRY?

People are not at all agreed as to what really happens when we say that someone's eyes are "sparkling." We all know that something happens in the eyes of people when they are delighted, and we know that it looks as if they shone, or something shone through them or from their surface. But if we watch very carefully, whenever our friends give us a chance, we shall find that there is more to notice than we thought.

Probably it is not the eye at all, in itself, but the eyelid that makes the difference. When we express merriment, the chances are very great that, whatever things look like, the effect is really obtained by the moving of some muscle or other.

In this case, people who have watched carefully declare that the eyelids make little, quick, lively movements, which attract the attention to the eye. Every time the eyelid falls it brushes a fresh tear over the eyeball, so that the surface of it is kept supplied with an unusual amount of fluid, and glistens for just the same reason that it glistens when we cry. But it is the eyelid that makes the difference, and not the eye at all, and this really causes the sparkling.

WHY MUST THE CLAWS OF CAGED BIRDS BE CUT?

Such things as bristles, hair, teeth, claws, and nails behave differently in various animals, according to the kind of use to which they are likely to be put. The rule, on the whole, is that when any of these things are liable to be used constantly in such a fashion as to rub them away, they keep on growing continuously throughout the life of the animal.

Our own teeth do not grow continuously, but the teeth of animals often do so. For instance, a hare may die of starvation because it has lost one of its teeth, and the tooth in the other jaw, opposite it, having nothing to rub against, grows and grows, and at last forces the poor creature's mouth open and so kills it by starvation.

Claws and teeth follow the same rules in many ways, for they belong to the same class. A bird's claws are meant to be constantly used. When we keep birds captive, and feed them without work on their part, the claws go on growing because they are no longer

worn away by use, and the friction, or rubbing down, which that involves, so they require to be cut by us.

WHAT MAKES THE KNOTS IN WOOD?

We know that knots are very common in woods of certain kinds, and in specimens which are good, and show no signs of disease. Therefore, knots are natural to these woods, and must have some purpose. The wood that makes them is extremely hard, as we know well in carpentering, and this hardness is explained when we learn that knots are, as a rule, simply hard places where branches are coming off from a larger stem. At such a place extra strength and firmness are naturally required.

In many trees, such as beech, and elm, and cedar, there are knots found at the surface of the woody part of the stem, and these have really been formed in the bark. They began their existence meaning to be buds, but have not gone on as they might have done, and have really come to nothing.

These baby buds, as they might be called, stop their development and, being pressed upon by the parts around them, they become very firm and hard. If they are cut across, we find that they are made of circles of woody material laid, or packed, very closely together.

WHY IS IT THAT INK STAINS, WHILE MILK AND WATER DO NOT?

Water does not stain because it contains nothing that can stain. It may produce a mark because, where it falls, it may wash out coloring matter from a fabric, as in the cover of a book, but in water there is nothing melted or hung—dissolved or suspended, to use the proper words—that the water can leave behind where it falls. Milk has a number of tiny balls of oil hung in it, and in falling upon anything it is likely to leave behind a certain number of these balls of oil, which we call cream; and these have a great way of catching dirt, as all oil has.

The case of ink is quite different, for this is water containing a number of colored things melted in it, among them salts of iron—a metal which has this peculiarity, that nearly all its salts are very highly colored. There is one particular salt, or mixture of salts, of iron that is deeply colored. It is called Prussian blue and is often used in ink.

Ink stains because when this solution, as it is called, of salts is exposed to the air, the water flies away into the air, and the coloring matter is left dry, and stains the paper, or the tablecloth, or whatever it may have fallen upon.

DOES A SOUND GO ON FOR EVER?

There is a true sense in which everything goes on for ever, and there is an equally true sense in which nothing goes on for ever. Nothing is destroyed and nothing is without everlasting consequences. But it is no less true that nothing goes on for ever *as it was;* for everything changes, and that is what the word evolution means—that everything always changes in an orderly way, though nothing is ever lost or destroyed.

No sound lasts for ever as a sound. It dies away and is heard no more. We may be watching it by scientific instruments which are more delicate than our ears. but after a time they will certainly record the fact that the sound is no more. The waves that made it have been smoothed away.

But all waves, of whatever kind, are made by power, and contain the power that made them; and, because no power is ever lost, this has to be accounted for when sound ceases. We could trace it in the movement of particles of air, and of other things; if we knew enough we could trace the doings of this power in our own ears, and we could also show that a certain amount of heat was produced. The sound ceases, it is true, but its effects do not; they go on for ever.

HOW CAN SOUND COME INTO A ROOM THROUGH A WALL?

When a sound wave, traveling in the air, reaches a wall, it communicates itself to the wall, which is thrown into waves of exactly the same shape and number in each second, but of rather smaller size, for a little power is lost in transferring the waves from one thing to another.

The waves travel on through the new medium, as it is called, and then are conveyed by it to the air on the other side of it, just as the head of a drum, when beaten, shakes the air next to it into waves. In this second transference back to air again, a certain amount of power is lost, and so the sound is a good deal weakened by having to pass through the wall.

Of course, the extent of this weakening will depend on the thickness and on the

material and structure of the wall. If we have materials like wool or sawdust or heavy curtain-hangings, which vibrate very badly and with much difficulty, they will absorb most of the sound wave and it will become faint.

WHY DOES THE PRICE OF BREAD CHANGE?

Bread has, on the whole, been growing dearer for many years, and there can be no doubt that, whatever our politicians do, it will become dearer still. Sometimes the price of bread depends upon accidental reasons. For instance, somebody in Chicago buys up wheat until he has the command of the market, and then sells it at high prices.

But, apart from this, wheat is growing dearer because the wheat-eating population of the world is increasing much more quickly than the world's supply of wheat. This is a very serious matter, which must have tremendous consequences. Many countries produce only a tiny proportion of the wheat they eat.

Great quantities of wheat are sent from America, but the population of America is increasing so much more quickly than its wheat that every year it is having less wheat to spare for export; and it is possible that, if things go on as they are now, in twenty years, or less, America will be sending no wheat abroad, but will be keeping all she has to feed her own people.

This, of course, means that bread will become dearer, and it will also mean that Europe must grow as much wheat as it possibly can.

WHY ARE WE NEVER SATISFIED?

There are a certain number of people in the world who *are* satisfied. They are to be found more especially in the East; but among the more active races of mankind it is scarcely possible to meet anyone who is satisfied. Even those who are contented look forward to a better life beyond this world. Now, we are always told that we should be satisfied, and that it is a great mistake always to go on striving and striving, and never to be content.

But it is one of the highest marks of human nature at its best that it always goes on, and that, whatever it attains, it always sees that there is something better beyond. So someone invented the phrase "divine discontent" to express the splendid longing that is in the heart of man. This becomes divine when the longing is not for ourselves, but for others and for the future of mankind.

If we carefully study the development of life in the world, we find that this quality of not being contented, this power to form a vision of the future and to try to realize it, is the great mark of mankind at its best; and it is a blind and foolish mistake to complain that people are never satisfied. What we should try to do is to stop the foolish and trifling dissatisfaction around us, and to replace it by something better.

We often speak of the Founder of Christianity as "gentle Jesus," but no one since the world began was ever more fiercely dissatisfied with evils and shams than He was, and His followers should be like Him in this respect.

CAN ONE PERSON INFLUENCE ANOTHER'S HEALTH BY WILL-POWER?

There is no doubt what this question means, though it is not very clearly expressed. If, by the exercise of our will, we take care of other people, we can, of course, influence their health in that way. No doubt what is meant is: Can we affect the health of other people for good or ill simply by willing to do so, without doing anything else? The answer most certainly is that we cannot; and it is a most important answer, for endless harm has been done in the world for ages past because men have believed that mere willing on the part of their enemies could affect them in this way.

The supposed great instance of the exercise of will-power is when people are mesmerized, or hypnotized. They pass into a curious kind of waking sleep, in which their health can be much affected for good or evil. It is supposed that this is done by the will-power of the person who hypnotizes them. This is utterly untrue. It has been proved by careful experiments that as long as the hypnotizer pretends that he is willing and exercising a great power, he can let his thoughts wander as much as he pleases, and the result will be just the same.

The fact is, that if people can be persuaded to believe in the possibility of it, they merely succeed in hypnotizing themselves; and all the talk of the great will-power of the hypnotizer is nothing else than deceit and nonsense.

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LITTLE GOODY TWOSHOES

CONTINUED FROM 5120

ALL the world must allow that Twoshoes was not her real name. No; her father's name was Meanwell, and he was for many years a considerable farmer in the parish where Margery was born; but he and his wife died, leaving Margery and her little brother to the mercies of the wide, wide world.

Little Margery and Tommy were both very ragged, and Tommy had two shoes, but Margery had but one. They had nothing, poor things, but their love for each other. Their relatives took no notice of them; but Mr. Smith, a very worthy clergyman who lived in the parish where little Margery and Tommy were born, sent for the children. A friend of his ordered little Margery a new pair of shoes, gave Mr. Smith some money to buy her clothes, and said he would take Tommy and make him a little sailor, while Mr. Smith promised to look after Margery.

Next morning the shoemaker came in with Margery's new shoes. She ran out to Mrs. Smith as soon as they were put on, and, stroking down her ragged apron, cried out:

"Two shoes, mamma; see, two shoes!"

And all the people she met she greeted in the same way, and thus obtained for herself the name of Goody Twoshoes, though her playmates called her Old Goody Twoshoes.

Little Margery was very happy in the home of Mr. and Mrs. Smith. She saw how good and how wise Mr. Smith was, and concluded that this was owing to his great learning, therefore she wanted, above all things, to learn to read. For this purpose she used to meet the little boys and girls as they came from school, borrow their books, and sit down and read till they returned. By this means she soon learned more than her playmates, and devised the following scheme for teaching those who were more ignorant than herself.

She found that only twenty-six letters were required to spell all the words in the world; but as some of these letters are large and some small, she, with her knife, cut out of several pieces of wood ten sets of each of the small ones and six sets of each of the large ones.

Every morning she used to go round with the wooden letters in a basket to teach the children.

I once went with her on her rounds. The first house we came to was Farmer Wilson's. Here Margery stopped, and ran up to the door, giving a tap.

"Who's there?"

"Only little Goody Twoshoes," answered Margery, "come to teach Billy."

"Oh, little Goody," says Mrs. Wilson, with pleasure in her face, "I

am glad to see you! Billy wants you sadly, for he has learned all his lesson."

Then out came the little boy, Billy. "How do, Doody Twoshoes?" says he, not being able to speak very plainly.

Yet this little boy had learned all his letters; for she threw down the alphabet all mixed together, and he picked them up, called them by their right names, and put them all in order.

The next place we came to was Gaffer Cook's cottage. Here some poor children met to learn, and all came round little Margery at once; and having pulled out her letters, she asked the boy next her what he had for dinner.

He answered, "Bread"—for the poor children in many places live on very little indeed.

"Well, then," says she, "set the first letter."

He then put up the letter *B*, to which the next added *r*, and the next *e*, the next *a*, the next *d*, and it stood thus: "*Bread.*"

"And what had you, Polly Comb, for your dinner?"

"Apple-pie," answered the little girl; and so the lesson went on.

The next place we came to was Farmer Thompson's, where there were a great many little ones waiting for her.

"Little Mrs. Goody Twoshoes," says one of them, "where have you been so long?"

"I have been teaching," says she, "longer than I intended, and am afraid I am come too soon for you now."

"No, but indeed you are not," replied the other, "for I know my lesson, and so does Sally Dawson, and so does Harry Wilson, and so do we all."

And they capered about as if they were overjoyed to see her.

"Why, then," says she, "you are all very good, and God will love you; so let us begin our lesson."

They all huddled round her, and though at the other place they were employed about words and syllables, here we had children of much greater ability, who dealt in sentences, which they set up and read aloud.

Mrs. Williams, who kept a college for instructing little gentlemen and ladies in the science of A, B, C, was at this time very old and infirm, and it was decided that Margery should take up her work. Henceforth she was known as Mrs. Margery.

One day Mrs. Margery brought home a fine raven which she had rescued from the cruel hands of some bad boys.

Now, this bird, which she called Ralph, she taught to speak, to spell, and to read. He sat at her elbow, and when any of the children were wrong, she used to call out, "Put them right, Ralph."

She had also a pigeon, which she had taught to spell and read, though not to talk. He was a very pretty fellow, and she called him Tom.

Soon after this a present was made to Mrs. Margery of a little dog, Jumper, and a pretty dog he was. Jumper was the porter of the college, for he would let nobody go out or come in without the leave of his mistress.

One Thursday morning Jumper all of a sudden laid hold of his mistress's apron, and endeavored to pull her out of the school. She was at first surprised; however, she followed him to see what he intended.

No sooner had he led her into the garden than he ran back and pulled out one of the children in the same manner; upon which, she ordered them all to leave the school immediately, and they had not been out five minutes before the top of the house fell in.

The downfall of the school was a great misfortune to Mrs. Margery, for she not only lost all her books, but was without a place to teach in. But a kind friend had it rebuilt for her.

Mrs. Margery was much esteemed by her neighbors. One gentleman, Sir Charles Jones, had conceived such a high opinion of her that he offered her a considerable sum to take care of his family; but she refused. This gentleman sent for her afterwards when he had a dangerous fit of illness, and she behaved so tenderly that he made her promise to marry him.

The wedding day arrived, and they went to the church. But just as the clergyman had opened his book, a gentleman ran into the church and cried:

"Stop! Stop!"

This gentleman turned out to be Mrs. Margery's brother, who had just come from beyond the sea, where he had made a large fortune, and hearing of his sister's intended wedding, he had ridden in haste to see that a proper settlement was made on her.

Mrs. Margery, after her marriage, still went on with her good works. She was a mother to the poor, a doctor to the sick, and a friend to all in distress.

THE BRAVE LITTLE DOG OF THE WOOD

BRISQUET was a poor woodcutter, who lived in the Forest of Lyons, with Brisquette, his young and pretty wife and Biscotin and Biscotine, his two little children.

Biscotin was a merry little brown-haired boy of seven years of age, and Biscotine was a charming maiden with bright blue eyes and golden hair, who was not quite six years old. The forest in which they lived was very wild and lonely, and their mother would never let them go farther than the shed at the end of the garden, where their father stored his wood, lest some wolf should attack them, for there were plenty of these fierce animals about.

THE PLUCKY LITTLE DOG WOULD NOT LET THE WOLF COME NEAR THE CHILDREN

Bichonne, a grey-coated little dog, with a red nose and soft brown eyes, was their only playmate. But he was so lively and good-natured that they never wearied of playing with him all day long on the green space before the cottage door.

One winter night Brisquet was late in coming home, a most unusual proceeding. "Run down to the shed, my darlings," said Brisquette to her children, "and see if you can find your father there." Biscotin and Biscotine ran out, hand-in-hand, and went merrily down the path leading to the shed. Bichonne, of course, began to follow them; but their mother called the dog back, saying:

"No, Bichonne! Wait till they return, and if your master is still in the forest, you must go alone and look for him."

Biscotin and Biscotine did not find their father in the shed, and they were frightened at his absence.

"Oh, daddy's lost—daddy's lost!" said the little boy. "I will go into the forest and find him, or let the wolves eat me!" And he ran into the wild, dark forest, and Biscotine took his hand and went with him.

Shortly afterwards, however, the father returned to his cottage by another path.

"Where are the children?" he exclaimed, surprised at their not coming to greet him.

"They went as far as the shed to search for you," said his wife, looking startled. "They must have gone into the forest. Oh, the wolves—the wolves!" Brisquet threw down his load of wood, and seized his axe, and looked round

for Bichonne. But as soon as the woodman had appeared without his children, the little dog had barked wildly, and dashed off into the forest.

Brisquet was very angry because his dog was not there to follow him at the very moment he needed his help most.

"I ought not to have had a little mongrel like him!" he exclaimed. "With a good thoroughbred I could easily follow the track of the children. Now I don't know what path they took."

But, on going a little way into the forest, he heard the sound of barking, mingled, it seemed, with the cries of children. Tearing wildly up to the spot, with his great axe lifted ready to strike, he saw a sight that filled him with joy and dismay. Biscotin and Biscotine were crouching together underneath a tree, and a great grey wolf was trying to spring upon them. But little Bichonne would not let the wolf come near the children. He was hardly a fourth of the size of the fierce, hungry animal; but he fought with such pluck and quickness that the wolf was unable to reach the children before their father arrived. With one blow from his axe Brisquet killed the wolf, and, taking the poor little wounded dog in his arm, he led Biscotin and Biscotine safely home.

THE MYSTERIOUS PORTRAIT

IN the little Japanese village of Yowcuski a looking-glass was an unheard-of thing, and the girls did not even know what their faces looked like except on hearing the description their lovers gave of their personal beauty.

Now, it happened that a young Japanese one day picked up in the street a small pocket hand-mirror.

It was, of course, the first time in his life that Kiki-Tsum had ever gazed on such a thing. He looked at it, and, to his intense astonishment, saw the image of a brown face, with dark, intelligent eyes, and a look of awe-struck wonderment on the features.

"It is my sainted father. How could his portrait have come here? Is it, perhaps, a warning of some kind?"

He folded the precious treasure up in his handkerchief, and put it in a large pocket of his loose blouse. When he went home that night he hid it away carefully in a vase, as he did not know of any safer place. He mentioned nothing of the adventure to his young wife, for, he said: "Women are curious, and then, too, sometimes they are given to talking."

For some days Kiki-Tsum was in a great state of excitement. He was thinking of the portrait all the time, and at intervals he would leave his work and suddenly appear at home to take a look at his treasure.

Now, in Japan, as in other countries, mysterious actions and irregular proceedings of all kinds have to be explained to a wife. Lili-Tsee, his wife, did not understand why her husband kept appearing at all hours of the day. And so Lili-Tsee fell to watching, and she noticed that he never went away until he had been alone in the little room at the back of the house. She hunted day after day to see if she could find some trace of anything in that little room which was at all unusual, but she found nothing.

One day, however, she happened to come in suddenly, and saw her husband replacing a rose-leaf vase. The moment he had gone she was upon a stool like lightning, and in a moment she had fished the looking-glass out of the vase. Then the terrible truth was clear. What was it she saw?

Why, the portrait of a woman! And she had believed that Kiki-Tsum was so good and so fond and so true!

Suddenly a fit of anger seized her, and she gazed at the glass again. The same face looked at her; but she wondered how her husband could admire such a wicked face.

She had no heart for anything, and did not even make any attempt to prepare a meal for her husband. When, later on, Kiki-Tsum arrived, he was surprised to find nothing ready for their evening meal.

"So this is the way in which you treat me, before we have been married even a year! What do you mean, Lili-Tsee?"

"What do I mean? What do you mean? The idea of your keeping portraits in my rose-leaf vase! Here take it and treasure it, for I do not want it. The wicked, wicked woman!"

"I can not understand," he exclaimed.

"Oh, you can't?" said she. "I can, though. You like that hideous, villainous-looking woman better than your own true wife!"

"Lili-Tsee, what do you mean? That portrait is the living image of my poor dead father. I found it in the street the other day, and put it in your vase for safety."

"Hear him! He wants to tell me I do not know a woman's face from a man's," replied Lili-Tsee, more angrily.

THE PRIEST TOOK THE GLASS IN HIS HAND AND LOOKED AT IT EARNESTLY

Things really began to look serious. It seemed as if their married life, which had hitherto been passed in happiness, was to be completely spoiled and made miserable by this mysterious portrait.

Kiki-Tsum was wild with indignation. The accusation of his wife was perfectly ridiculous. Of course the portrait was not that of a woman, but of his father. It was impossible that he could be mistaken. The loud, angry words attracted the notice of a Japanese priest who was passing. He stopped and listened for a moment. Such a quarrel, he thought, must not be allowed to continue. It was probably some slight misunderstanding which he would soon be able to put right.

"My children," he said, putting his head in at the door, "why this unseemly anger? Why this dispute?"

"Father, my wife is mad."

"All women are so, my son, more or less. You were wrong to expect perfection. It is no use getting angry."

"My husband has a portrait of a woman hidden in my rose-leaf vase."

"I swear that I have no portrait but that of my poor dead father."

"My children, show me the portrait."

The priest took the glass and looked at it earnestly. He then bowed low before it, and, in an altered tone, said:

"My children, settle your quarrel and live peaceably together. You are both in the wrong. This portrait is that of a saintly, venerable priest. I know not how you could mistake so holy a face."

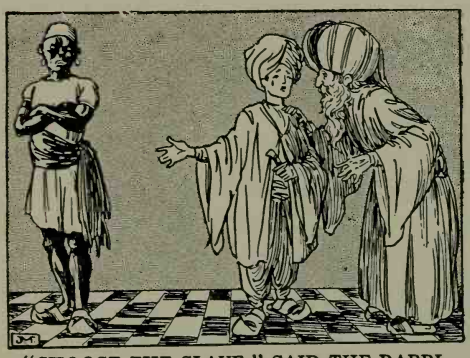
He blessed them, and then went away, carrying with him the glass to place with other precious relics of the church.

STORIES FROM THE TALMUD

THE HEIR AND THE WILL

A RICH Jew, on his death, left a will bequeathing all his property to a slave, on the sole condition that the slave should allow the son of the dead man, who was in a distant city, to select just one article from the property.

The slave was delighted with his good fortune, and hurried off to the



"CHOOSE THE SLAVE," SAID THE RABBI

distant city to inform the son of what had happened. Of course the young man was astonished at his father's will, and greatly grieved. He could not understand why he should have treated him in this way, and complained to a rabbi of his parent's injustice.

But, having expected sympathy and comfort in his distress, the young man was amazed at the rabbi's words.

"What a wise man your father was!" said he. "This will shows that he was wonderfully far-seeing. By it he has preserved all his property to you. Had he left it to you in his will you would have received little of it, for, the heir being such a distance away from home, the slave would have plundered the estate. But your father bequeathed everything to his slave, knowing that the man would take care of the property when he believed it to be his own."

"But how does all that benefit me when the property is left away from me?" asked the young man in surprise.

"Do you not know that all a slave possesses belongs to his master?" said the rabbi. "You may select just one article. Choose the slave, and then the whole of the property will be yours."

This the young man did, and ever blessed the far-seeing wisdom of his father which had saved for him his inheritance.

THE DINNER AT THE INN

A YOUNG man called at an inn, and was invited to sit down to dinner with the landlord, his wife, two sons, and two daughters. Five pigeons and a fowl were placed upon the table, and the young man was asked to carve and serve. Dividing one pigeon between the two sons, another between the two daughters, and another between the landlord and his wife, he kept two birds for himself.

The host was surprised at this method of distributing the food, but when the pigeons were eaten he asked the young man to carve the fowl. The youth did so, giving the head to the landlord and his wife, a leg to each of the sons, a wing to each of the daughters, and took the body for himself. The landlord asked for an explanation.

"I have done the best I could to make things equal," said the young man. "You, your wife, and one pigeon make three; your two sons and one pigeon make three; your two daughters and one pigeon make three; and I and two pigeons make three. With regard to the fowl, I gave the head to you and your wife because you are the heads of the

THE YOUNG MAN WAS ASKED TO CARVE

family. I gave to your sons the legs, because they are the supports of the family. I gave to your daughters the wings, because they will marry, take wings, and fly away from your home. I took the body of the fowl for myself because it looks like a ship, and it was in a ship that I came here, and in a ship that I hope to return to my home."

STORIES OF GREECE AND ROME

THE TWELVE LABOURS OF HERCULES

AS well as cultivating all that is beautiful in art and letters, the ancient Greeks worshipped sheer physical strength. High in honor among their heroes was Hercules, whom they adopted as the patron of strength. "The labors of Hercules" has become a well-known phrase, and the separate titles of the labors are often quoted to-day. "Cleansing the Augean stables," for instance, is another way of speaking of the clearing up of some nearly hopeless muddle. In his youth Hercules roused the jealousy of Eurystheus, King of Argolis, into whose power the gods placed him for a long term of service. Eurystheus gave Hercules the following tasks to perform.

THE SNAKE WITH A HUNDRED HEADS

THE hydra was a monstrous water-snake with seven or nine heads, which grew again as fast as they were cut off. This fierce monster devastated Argolis, dragging both men and beasts into the swamp where it lived, and there strangling them. Hercules was aided by his friend Iolus, who applied a lighted firebrand to the stumps immediately after Hercules had cut off the heads with his sword. They both dipped their arrows in its poisonous gall so that the wounds they gave should be incurable.

SLAYING THE LION

A DREADFUL lion was terrifying the inhabitants of a district in Argolis, coming out of the forest from time to time and killing the inhabitants of the neighboring villages. So powerful was the beast that none dare attack it, and no sword or arrow could pierce its skin; but Hercules seized the lion in his powerful arms and forced it on its back. Then he knelt upon it and strangled it with his hands. The hero removed its invulnerable skin, and ever after that he wore it round his own shoulders.

THE YOUTHFUL HERCULES

THE CAPTURE OF THE SACRED STAG

THERE lived on the Ceryneian Mountain a wonderful stag that was sacred to Diana, the goddess of hunting. Its horns were of pure gold, its hoofs were of brass, and it was so fleet of foot that no man had ever been able to catch it. Hercules was commanded to capture it and to bring it unhurt to Eurystheus. This he succeeded in doing after a full year's chase through the forests that in those days almost covered the south of Greece. As he was returning, the wrathful Diana met him, but she was appeased when he told her his story.

CLEANSING THE STABLES

ONE of the labors of Hercules has given a proverb to the world, for when we wish to call a task almost impossible of accomplishment, we speak of it as like "cleansing the Augean stables." Augeas was King of Elis, and the owner of some 3,000 head of cattle. The stables in which these cattle lived had never been cleansed, and were in a terrible state of filth, so that the task of cleaning them out in one day seemed impossible even for Hercules. Yet he easily effected it by breaking down a part of the wall, and diverting through the stables a river that flowed close by, thus washing out thoroughly the horrible mire and filth within.

THE ARCADIAN BOAR

THE neighboring state of Arcadia was in great danger of being ruined by a huge boar which came down from Mount Erymanthus, and spared neither man nor beast. Hercules was accordingly sent to capture the beast. The boar had hitherto defied all the attacks and ruses of the Arcadian shepherd folk, but when the terrible monster saw Hercules it turned and fled up the snow-clad mountains, with Hercules in full chase. He succeeded in bringing it to Eurystheus, however, who was so terrified at the sight of it that he crept into a cask to hide.

THE BIRDS WITH THE BRAZEN WINGS

THE marshy forests around Lake Stymphalis, in Arcadia, were infested by some voracious birds whose wings, talons, and heads were of brass. These birds fed on the flesh of men and animals. When sent to slay them, Hercules was puzzled how to get near them, so inaccessible was their nest. He therefore begged Minerva, the goddess

of brave deeds, to help him, and she gave him a brazen rattle. Hercules stood on the shores of the lake and made the woods re-echo with a terrible din. The startled birds flew out into the open, and Hercules shot them one by one with his poisoned arrows.

THE MAD BULL OF CRETE

MINOS, King of Crete, an island to the south of Greece, had once promised to sacrifice a huge bull to Neptune, the god of the sea. Because of its great size and beauty, however, Minos had kept it for himself. The bull went mad and began to destroy the crops of the island. Hercules captured it, and brought the raging beast alive to Mycenæ as his seventh labor, but King Eurystheus foolishly let it loose, and it crossed the Isthmus of Corinth and ravaged the valley of Marathon, in Attica.

THE MAN-EATING HORSES

DIOMEDES, King of Thrace, was so cruel that he was wont to throw all strangers to some wild horses, which devoured them. Hercules, with some of his brave friends, sailed to Thrace, attacked and captured the tyrant, and gave him to his own horses to eat. Hercules then brought the horses over the sea to Mycenæ, and drove them up into the mountains, where they were torn to pieces by other wild beasts.

THE GIRDLE OF THE AMAZON QUEEN

IN the ninth labor Hercules had also to make a long journey. This time he was sent to fetch the girdle of Hippolyte, the queen of the warlike Amazons, who dwelt in the land of Scythia, in the south of the country we now call Russia. Some say that he killed the queen after a hard fight, and others that he only captured her and gave her in marriage to his friend Theseus. At any rate, he succeeded in his object of bringing the famous girdle back to Eurystheus.

THE BATTLE WITH THE GIANT

FAR away from Greece, in the unknown western sea, there was an island called Gades. Traders brought strange tidings thence of a three-bodied giant named Geryon, who owned beautiful herds of cattle, and a two-headed dog to watch over them. Hercules was sent to fetch these cattle. Many are the tales told by the Greek poets about this journey—how, for instance, scorched by the heat, he tried to shoot the sun-god, who, admiring his audacity, gave him a golden bowl wherein he sailed to the island, passing through the Straits of Gibraltar, the rocks looking down upon which were called the Pillars of Hercules.

The hero slew the giant's herdsmen and his two-headed dog, but just as he was driving off the cattle Geryon came up in hot haste and seized him. After a terrific struggle Geryon was defeated. Even then all was not peaceful sailing homewards, for in Italy a fire-breathing giant called Cacus stole some of the herd, and hid them in a cave, dragging them backwards, so that their tracks should deceive their owner. Hercules, however, heard the lowing of the cattle, squeezed Cacus to death, and set them free.

THE GOLDEN APPLES

IN a beautiful land in the west of Africa lived some nymphs called the Hesperides. It was their duty to guard the fruit which Mother Earth had presented to the goddess Juno as a bridal gift. A sleepless dragon guarded the plantation where grew the golden apples, and the way was full of difficulties that led to it. After many wanderings and terrible fights with giants and tyrants, Hercules succeeded in catching Nereus, one of the gods of the sea, who changed into all kinds of shapes in his endeavors to escape from the strong hands that gripped him. Finding all his wiles of no avail, he resumed his natural shape and sent Hercules to Atlas, who agreed to bring the fruit, on condition that Hercules supported the heavens while he was away.

THE DOG OF THE UNDERWORLD

AT the entrance to Hades, the abode of the dead, there kept guard a three-headed dog named Cerberus, whose duty it was to prevent the living from entering and the dead from escaping out of the shadow-kingdom. Pluto, the dark-visaged King of the Underworld, gave Hercules permission to take the dog up into the light, provided that he did not use weapons. This Hercules, by his mighty strength, succeeded in doing, and he also led it back uninjured. Hercules was then freed from his labors, and thereafter went about the world performing many brave and noble deeds, and has ever since been held up to honor as the best type of physical strength.

THE NEXT STORIES ARE ON PAGE 5285.

WHAT THIS STORY TELLS US

WE know how the thinking part of the mind, the intelligence or intellect, which learns, argues, and reasons, begins in what our senses tell us. And we know that there is a gradual progress from mere sensation, like knowing the difference between light and darkness, up to the ability to turn a telescope in a certain direction and to know that we shall find there a new star in the dark sky. We cannot study the intellect too deeply, and, in one sense, we can scarcely exaggerate its importance. Our possession of the power to think is the great mark that distinguishes us from the lower animals. It is by means of memory, and the power of calling up images in our mind, that we are able to think of ourselves in the past and in the future. This power of being aware of ourselves, of being able to figure ourselves in the past and in the future, is called *self-consciousness,* and is the great mark of man. But it is wrong to suppose, as many do, that the intellect decides our deeds. We read here how great a mistake that is.

WHY WE DO THINGS

CONTINUED FROM 5083

PEOPLE used to suppose that knowledge made character, and so they thought that by teaching everybody how to read and write and do sums, everyone would be made wise and good. Now we know that in reality, though learning things is so useful, and though we cannot do without knowledge, knowledge does not in itself make us wise and good. The point is that knowledge and the intellect do not decide our deeds, one way or the other; they are simply power; and power, like dynamite, may cause an explosion and bury a hundred men, or it may blast the rock which buries them, and set them free.

The boy who learns to write may turn his knowledge to good account by writing something that will make men better for all time to come; or he may turn his knowledge to account by writing poisonous lies, or by forging someone else's name.

There is another part of the mind more important than the intellect; more important just because it, and not the intellect decides our deeds; and this is the part of the mind which feels and wills. Feeling is a word which is used in two ways in English; we say that we feel hot, and we say that we feel angry; but these are different things—sensation and emotion — though they may go together. When we talk of the part of us which feels and wills, we mean the part which feels angry, happy, sorry, brave, cowardly, tender, cruel, and so on. The proper name for these feelings is *emotions,* and it is emotions that decide our deeds. That is why they are really the most important part of the human mind. Everyone will agree that the really important thing is deeds; it is deeds that make the man, and the nation, and history.

Now, some child may say that it is all very well for us to dismiss knowledge as if it did not affect our deeds; but that, in fact, every moment of our lives we act differently according to what we know, or think we know, or do not know. If it comes to that, one cannot forge a check unless one has the knowledge how to write; people who have not that knowledge do not forge checks, and so knowledge *does* make a difference to their deeds.

That is perfectly true, and a perfectly right criticism, and it brings us to the great point upon which so many mistakes are made. It is true that knowledge alters our deeds in a thousand ways every day. We act according to knowledge, or what we think to be knowledge; and yet what we said before was true. The man who wishes to take what does not

belong to him wishes that none the less or none the more because he can write. If a man cannot write he may pick a pocket; if he *can* write he may forge a check; but in either case he is a thief —he wishes to steal. He will steal in a different way in the two cases, but stealing is stealing; and in both cases his theft is decided by feelings that he has, and feelings that he has not—emotions of desire for gold, without emotions of self-respect, or of consideration for the person who loses the gold, and perhaps without emotions of fear that he may be found out.

The truth is that reason and knowledge are pilots. The pilot is a guide, but the pilot does not decide where the ship is to go; something else does that. Perhaps it is a gale of wind; perhaps, if the ship is a human being, it is a gust of passion. The pilot is not the dictator; something else is the dictator, and calls in the pilot in order to gain its end, as when a thief wants money and calls in his knowledge of forcing locks, or of forging, or of cheating at cards, in order to gain his end. As a rule, what we want is happiness, perhaps by serving ourselves, perhaps by serving other people. Reason and knowledge do not make us desire happiness, but they tell us how we may best achieve it.

A COMMON MISTAKE THAT AFFECTS EVERYTHING WE DO

The common mistake that is made in this matter leads us to think that we have only to teach people, and they will act reasonably or rationally. It is often declared that man is a rational animal, meaning that he has a reason. It is true that man has a reason, but if he had nothing else he would never do anything; he would never make a movement but to breathe. The mistake is so serious because it affects everything we do in the way of education.

As a rule, we show little interest in the feelings or emotions of boys and girls, though these are the mainsprings of all human action; but we spend all our time in trying to develop the intellect, as if to know the right were to follow it. We teach a boy not to steal, and his intellect perfectly understands what we mean; yet he may steal, and we are surprised and disappointed. That is because we have not first taught ourselves how human nature is made. What we need to-day, and what is always needed, is men of good will; and the great business of real education and the real bringing up of children is to try to make them into men and women of good will. That is what we mean when we talk about training character, and the importance of character-making is that character, and not intellect, makes our conduct.

THE GREAT PART PLAYED BY FEAR IN THE HISTORY OF THE WORLD

When we come to study our emotions, or feelings in that sense of the word, we find that they correspond exactly to what are commonly called instincts. This has lately been proved by an English student of the mind, and is indeed a very important discovery. For instance, everyone knows that there is such a thing as the instinct of flight, and we know quite well that flight has something to do with being afraid.

This emotion of fear is one of the great emotions that decide the deeds of men and women and children in all places and ages. We may fear for ourselves, or for others; we may fear for this world, or for the hereafter. But in any case this is one of the great emotions that make history. Fear especially acts by preventing actions; it is the great controlling emotion which keeps people from doing things, and it has always been used by masters and governors of all kinds as the instrument by which they prevented people from doing what they did not want them to do.

Another important emotion is the emotion of disgust, which is not the same as fear; and that goes with the instinct which may be called the instinct of repulsion, which makes us shrink from slimy things in our food.

THE FEELING OF WONDER WHICH WE SHOULD NEVER LET DIE

Much more important is the instinct of curiosity, which goes with the emotion of wonder. Curiosity has become very marked among the higher animals, and it is stronger among the monkeys and apes than among any other creatures except ourselves. This emotion of wonder is very powerful in human life. But it is not really very common in grown-up people in any strong form. Practically all children have it, and perhaps it often leads them into mischief, gets them into accidents, and so on, but

boys and girls would learn very little indeed without it.

Among grown-up people the feeling of wonder often dies, and they take all usual things for granted. Yet the instinct of curiosity and the emotion of wonder are immensely important, because in every age they persist in a few people, even when those people grow up. In them it is the main source of their intellectual effort; it is one of the principal roots of both science and religion, driving men to discovery and invention and to theories of the world and of mankind. We are on the way toward having a really great man when a strong emotion of wonder and the instinct of curiosity are combined with a fine intellect which he can use as their instrument.

Very important also is the fighting instinct, and the emotion of anger which goes with it. This is not nearly so common as, for instance, the emotion of fear, which in some form or other is possessed by everybody—even by those who think they do not know what fear is. It is a remarkable fact, for instance, that the fighting instinct and the emotion of anger are so very much more powerful in men than in women.

How we show our relation to wild beasts when we are angry

In the lower animals we generally find that this instinct and this emotion occur among females only when they have their young to protect. But at such times they are extremely powerful, as men have known for many ages.

Anyone can see the importance of this, for it means the protection of the young and the future of the race; and that is why we find the character of the creature showing a new side, which no one could have guessed, when she becomes a mother. She is then capable of such tremendous anger that her young are protected. We think of the tiger as a courageous and terrible animal, but Darwin tells us that in India even the tiger very rarely dares to attack a young elephant protected by its mother —though perhaps he would not hesitate to attack the mother herself at any other time.

When we are under the influence of the fighting instinct and the feeling of anger, we sometimes show significant signs of our relation to the lower animals. We are likely sometimes to raise the upper lip and sneer and snarl. What this really means, if we knew it, is baring the teeth to prepare for biting. As with most of the other human instincts the excitement of this one is expressed in its purest form by children. Many a little boy has, without any example or suggestion, suddenly taken to running with open mouth to bite the person who has angered him, much to the distress of his parents.

The feelings that grow in us as we grow up

As we grow older these feelings do not disappear in us, but they take a different form, which is not only different, but higher. It is one of the great marks of mankind that our instincts may take higher forms as we grow up. In well-developed men anger and the fighting instinct take the form of giving them courage, energy, and persistence. If difficulties are in the way, they only arouse our opposition and make us determined to overcome them. So we see that this instinct may have low forms and high forms.

Next we come to the most important of all our instincts, without which no human being could survive its birth for more than a few hours. This is the instinct of fathers and mothers, found much more strongly in mothers, though many fathers have it too. We may call it the mother instinct, though the more correct name for it is the *parental instinct*. So far as we know the world within us and the universe without us, this feeling is the noblest and highest of existing things—nor can we imagine anything higher; so that we call God Father, and say that God is Love.

The beginning of the love of parents for their children

This instinct is more important for mankind than it is for any animals, for human babies are born more helpless and need love and care much longer than the offspring of any other living creature. This instinct which impels the mother to protect and cherish her young is not found among the lowest animals, but is found in increasing strength among the higher kinds of animals.

So far as we can judge, it began in the history of the world with fishes, that is to say, with the first backbone animals; though the way in which the worker-bee cares for the young bees

ought to be remembered. We do not know how old the bee societies are. But, at any rate, some fishes watch over their eggs, and drive away enemies which might destroy them. From this stage onwards in the history of animal evolution the protection of the young by the parents comes more and more to depend upon the parent's feelings and behavior, and the young need parental tenderness for a longer and longer period.

At last we reach the highest stage, where comparatively few young beings are born, but they are so well taken care of that most of them grow up. In such cases, says one authority, "the protection and cherishing of the young is the constant and all-absorbing occupation of the mother, to which she devotes all her energies, and in the course of which she will at any time undergo privation, pain, and death. The instinct becomes more powerful than any other, and can over-ride any other, even fear itself; for it works directly in the service of the race, while the other instincts work primarily in the service of the individual life, for which Nature cares little."

THE WONDERFUL LOVE OF A MONKEY AT THE ZOO

If we study this noblest of instincts among animals, it is the monkeys, and especially the apes, that show it to us in the highest degree. There was seen at the zoological gardens, at the time when this was written, a monkey, lower than an ape, who had held one arm round her baby without one second's interruption, asleep or awake, ever since its birth several months before.

No one can question for a moment that this instinct goes with the emotion of love or tenderness. We can see it in our domestic cats, and it may often be noticed among birds. During sixteen hours of a summer day, a pair of tits, father and mother, carried without interruption two thousand separate morsels of food to their young ones. Only a powerful feeling could enable them to continue such a work. It is now agreed by careful students that this feeling is special and peculiar, and not a mixture of any other feeling; it is the feeling which the human mother has when she looks at her helpless baby. But, as is the case with the other instincts of human beings, it may take various other forms, as we shall see. It is a very striking fact that only in recent years has the existence and the importance of this feeling been recognized; and great thinkers in the past have actually declared that all the good and tender feelings that are experienced by human beings were obtained through education. On the contrary, they exist in our nature, and this is their root.

THE STRENGTH OF THE LOVE OF PARENTS FOR THEIR CHILDREN

It is true that among many savage peoples, and even among some civilized races, such as the Chinese, little babies, and especially girl babies, are killed, and some have supposed this to mean that there was no feeling of love for babies among such peoples. This is not the case. The reason for the babies being killed is that there may be room for those who live, and when this terrible thing is done, the rule is that it is done in the first few hours after the baby is born. If a baby survives a day or two, its life is safe, because already it has called out the love and tenderness of its parents.

The feeling of parents for their young is far stronger than the feeling of children for their parents—a proof of the fact that this feeling is not gratitude or expectation of advantage, but genuinely unselfish. If, as was once asserted, parents cared for their children because they expected their children to care for them when they grew old, then children should care for their parents more than parents for their children. Yet we find that, though children owe everything to their parents, and though the parent's life may be perhaps a long period of pain and sacrifice and anxiety for the sake of the child, parental love is far stronger, because it is rooted in this great instinct, without which the race could not possibly go on.

THE LOVE FROM WHICH ALL OTHER GOOD THINGS SPRING

We see now that from this instinct, and the love which goes with it, spring all the good things in human nature—generosity, gratitude, pity, unselfishness, true love of our neighbors. When we seem to do good deeds for any other reason than the fact that this feeling is behind us, our deeds are not really good, but are done for the sake of some reward, or to avoid some punishment. The great fighting instinct, together

with its emotion of anger, is specially aroused whenever the working of some other great instinct is interfered with. We saw how even gentle female nature may become fierce and terrible when the parental instinct joins with the fighting instinct, and this relation between tenderness and anger is extremely important.

When we find a man, or many men, indignant at some injustice or cruelty—at slavery, or cruelty to children, or massacres in Eastern Europe, or barbarity in the Congo—it is tenderness for the helpless, coupled with anger and the strong fighting instinct, that really makes this splendid indignation.

THE MEANING OF A CHILD'S GREAT LOVE FOR A DOLL

It is very interesting to ask when the parental instinct begins to show itself in human beings, and at once we find that this great instinct begins very early. The love of dolls is the childish prophecy of it. It is not at all true, as some have said, that a doll is merely a possession to a child, and that it will be just as pleased with anything else that is its own. The child prefers a doll, as everyone knows who has had the opportunity of watching young children. This parental instinct is genuinely inborn in children. A little girl fond of dolls will be only too delighted to exchange her doll for a real baby. A little girl not two years old has been seen—in a case where she could not possibly have been imitating anyone else—to kiss a small baby, and stroke its hands, and whisper to it, and act like a mother to it as plainly as could be.

There are some other instincts of less importance, but it will be enough for us to have learned once and for all how important the instincts are, to learn that with each of the great instincts there goes a special kind of feeling, and, above all things, to learn that these instincts and feelings are the great things that make our conduct.

THE GREAT POWER OF SYMPATHY, FOR HAPPINESS OR FOR MISERY

Three new words describe other facts of our minds which also explain a great many of the things that we do; these words are *sympathy*, *suggestion*, and *imitation*. Sympathy really means "feeling with," and it is a fact that the signs of other people's feelings incline us to feel the same way. A baby smiles when it sees a smiling face; a baby or small child is very likely to cry when it hears other children crying. A merry face makes us feel brighter; we are terrified when we hear other people scream with terror. Nothing makes us angry more readily than other people's anger. Everyone knows what a difference it makes to be in one kind of company rather than another. In this sense of the word we must not suppose that sympathy always means kindness or goodness; that only springs from tender emotion. A person who has not tender emotion may still be very much affected by other people's sorrow or misery.

Suggestion is an extraordinary power that we have over each other whereby we can convince each other about things, and often persuade each other to do all sorts of things without any real reason. Suggestion is best seen amongst children and childlike people, and children are commonly very much affected by older people, and the appearance of knowledge and strength and power that older people have.

HOW A HEADACHE MAY GO IF SOMEBODY SAYS IT IS GONE

It would be easy to write a book about suggestion, and indeed, many books have been written on the kind of suggestion that occurs when people have been *hypnotized*, as it is called. They are thrown into a kind of half-sleep in which they listen very readily to any suggestions that are made to them. This may be very useful if, for instance, a person has had a bad headache for months, and when hypnotized by some responsible person, he is told that the headache has gone and will not come back. Such is the power of suggestion that this will actually happen.

Imitation is also a great fact of our minds, living as we do in each other's company, for it explains a great many of the facts and the doings of men. We see it at all ages, and especially in the earlier ages of life, and it is one of those things to be remembered by people who suppose that man is a rational animal in the sense that he never does anything without a well-thought-out, logical reason for it.

THE NEXT PART OF THIS IS ON PAGE 5303.

LES ENFANTS DANS LA FORÊT

The English version of this story is given on page 1523.

IL y avait une fois deux enfants qui habitaient une grande maison à la lisière d'un bois. Leurs parents, qui les aimaient tendrement, étaient assez riches pour leur acheter toutes les belles choses qu'ils désiraient, et toute la journée, ils jouaient dans un superbe jardin, y apprenant les chants des oiseaux et les secrets des fleurs. Mais un triste jour, leurs parents les quittèrent pour un séjour meilleur, dans le ciel, et le frère et la sœur restèrent seuls.

Le garçon fit de son mieux pour consoler sa petite sœur, mais les jours étaient tristes et bien qu'alors ils ne s'en rendissent pas compte, des jours plus sombres devaient bientôt venir.

Les enfants avaient un oncle qu'ils n'avaient jamais vu. Il habitait au loin, par delà les mers; mais dès qu'il apprit la mort de son frère, le père des enfants, il se hâta d'aller chez eux. Il savait que maintenant que leur père était mort, les enfants auraient tout son argent, et l'oncle savait aussi que s'il pouvait se débarasser d'eux, tout l'argent serait à lui.

Et plus il songeait à cet argent, plus il le désirait. Et alors, une pensée affreuse lui passa par la tête. Il résolut de tuer les deux petits innocents et de prendre leur argent.

Il engagea donc deux voleurs et les paya pour entraîner les enfants dans un endroit écarté du bois et les tuer.

Un matin, tandis que le soleil brillait et que tous les oiseaux étaient gais, les voleurs se glissèrent dans le jardin où les enfants jouaient, et les ravirent. Ils étaient grands et rudes, et les enfants eurent peur; mais les voleurs leur dirent qu'ils avaient été envoyés par leur oncle et ils n'osèrent pas désobéir. Les hommes les entraînèrent hors du jardin dans la forêt, et marchèrent jusqu'à ce qu'ils atteignissent un lieu écarté.

La route avait été longue et les enfants furent heureux de se reposer. Ils s'assirent sur un tronc d'arbre pendant que les voleurs s'éloignaient et causaient à voix basse.

Mais bientôt, ils se mirent à se disputer; leurs voix étaient fortes et pleines de colère, et les enfants entendirent des paroles qui les firent trembler de peur.

"J'ai été payé pour les tuer, et je veux gagner mon argent," l'un d'eux répétait sans cesse.

Mais l'autre voleur semblait plus bienveillant.

"Pourquoi les tuer?" dit-il. "Pardons-les, et peut-être que quelqu'un les trouvera et leur donnera abri."

La petite fille se serra contre son frère. "Ils veulent nous tuer," dit-elle, dans un murmure terrifié.

Mais avant que le garçon pût répondre, le voleur bienveillant s'avança et leur parla.

"Restez ici pendant que nous allons chercher de la nourriture et un abri pour la nuit," dit-il d'une voix rauque.

Ils s'éloignèrent ensuite et les enfants restèrent seuls dans le bois. Ils n'osaient pas retourner chez leur méchant oncle et ils n'avaient pas d'autre demeure; ils allèrent donc à l'aventure, la main dans la main, dans l'espoir de trouver un refuge.

La forêt était très belle, et d'abord, ils furent heureux parmi les fleurs sauvages et les fougères; mais bientôt le soleil se coucha, les oiseaux cessèrent de chanter et un grand silence enveloppa tout. Les enfants, toutefois, continuèrent bravement d'avancer, fatigués, affamés, et tristes.

Bientôt, les arbres furent si serrés les uns contre les autres qu'ils purent à peine trouver un passage, et finalement, les ténèbres de la nuit descendirent et cachèrent même les arbres à leur vue. Trop épuisés et effrayés pour aller plus loin, les enfants s'assirent sous un chêne et s'endormirent dans les bras l'un de l'autre.

Les oiseaux de la forêt les regardèrent du haut de leurs nids; les timides écureuils aux longues queues, les contemplèrent avec surprise et la brise secoua les feuilles et les fit tomber, les couvrant ainsi d'un manteau de pourpre et d'or.

Et quand le jour luit, un bel ange descendit et les emporta vers leur père et leur mère, dans le ciel superbe.

WHAT THIS STORY TELLS US

As our cities grow, the problem of securing enough good water becomes more and more serious. In this article you are told how one city has had to spend nearly $200,000,000 to bring water a hundred miles, through mountains, across valleys and under rivers. Thousands of men worked for more than seven years to do this, and the story of what has been done seems impossible to believe. Though the cost seems enormous it is money well spent, for if the city should be without water a single day, the cost in human life and property might easily be greater than the cost of the whole work.

A RIVER UNDER A CITY

CONTINUED FROM 5144

IN another part of our book you are shown some pictures of the journey which the water you turn into your bathtub has made. In most towns and small cities, it is not a very difficult matter to get a sufficient supply of water, but the larger the city, the more difficult it is to get a large quantity of water pure enough to use.

Greater New York has nearly 6,000,000 people, and the population increases nearly 150,000 every year. Think of it! This great city adds what most of us would call quite an important city to itself every year, and, besides, there are always present strangers and visitors enough to make several other cities.

Years ago, during a summer in which less rain than usual fell, the water in the reservoirs became dangerously low. If the supply failed even for a single day, disease was sure to follow, and also the factories would suffer much loss. So men were sent to examine all the streams around the city, and decide where a larger supply of pure water could be found. These engineers reported that the nearest large supply of good water was in the Catskill Mountains, a hundred miles away, and across the Hudson River.

Work was soon begun, and thousands of men worked for more than seven years to bring the water to the city. First the land for the reservoir was bought and the ground cleared. Seven villages sheltering about 2000 persons were destroyed, thirty-two cemeteries were moved, eleven miles of railway, which crossed the land chosen for the new lake, were moved to one side, and a great dam was built across Esopus Creek, and extended to the hills on each side in order to make a lake to hold the water.

This great dam is nearly a mile long, and is 220 feet high from the creek bed. At the bottom it is one hundred and ninety feet, nearly a city block, thick, gradually lessening to twenty-three feet at the top, along which a carriage road runs. All of it is not built of stone, however, but only that part against which the full depth of the water presses. Much of it is really two earthen embankments with concrete centres. This dam makes a lake forty miles around, and one hundred and ninety feet deep at the deepest part. It can hold, when full, enough water to cover the whole of Manhattan Island twenty-eight feet deep.

The water goes from this great Ashokan Reservoir into the Kensico Reservoir, sixty-four miles nearer the city, so that if an accident occurred at the upper reservoir, there would still be water enough in store to last the city two months. There is still a third reservoir on the edge of the city, and from it the water is led under the city.

The picture shows how the water starts from the great lake. Where the ground slopes only slightly, the great

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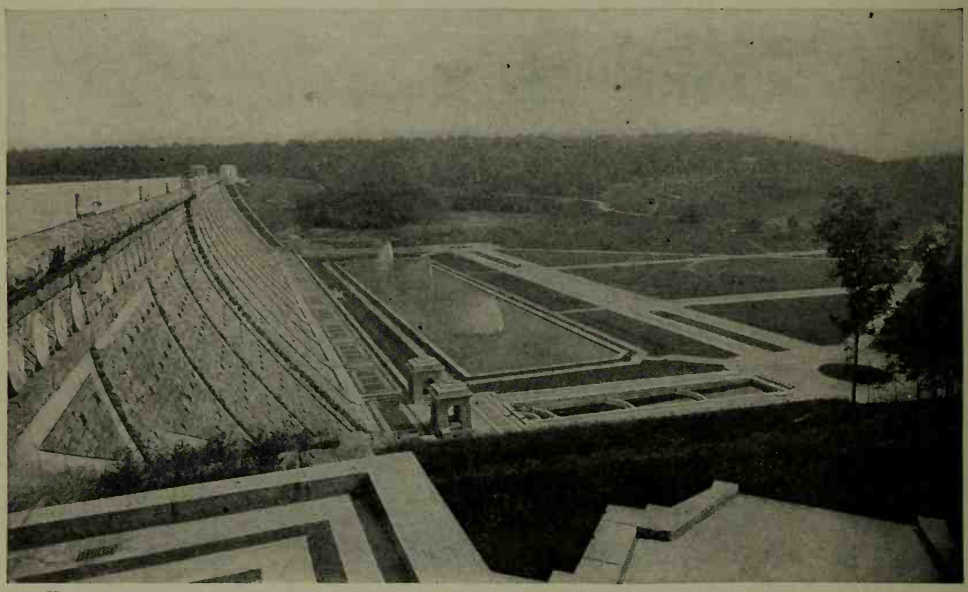
aqueduct, built of concrete, was laid in a ditch, dug for the purpose, and then was covered with earth. At such places the aqueduct is seventeen feet high and more than seventeen feet wide. When hills were reached, tunnels were driven through them. There are twenty-four of these tunnels. When deep valleys or streams were to be crossed, either tunnels were driven far beneath them, or else great iron pipes lined and covered with concrete led the water across the valley and up the slope of the hills.

When the water reached the Hudson River there was another problem. The river is wide and deep, and the rock in the bed of the river is soft and full of seams. Finally, after boring deep down, hard rock was found. So on each side of the river a shaft was sunk eleven hundred feet, and men began to dig and to blast a tunnel toward the centre of the river. Think of it! Eleven hundred feet below the surface of the earth, two sets of men were tunneling toward each other. So carefully were the calculations made that the two tunnels came together under the river-bed just as the engineers had planned. This tunnel was also lined with concrete. So when the water reaches the great river it drops 1,114 feet, flows under the river-bed and then rises again to the surface of the ground, and continues its way to the second reservoir. Smaller streams were crossed, or rather burrowed under, in the same way.

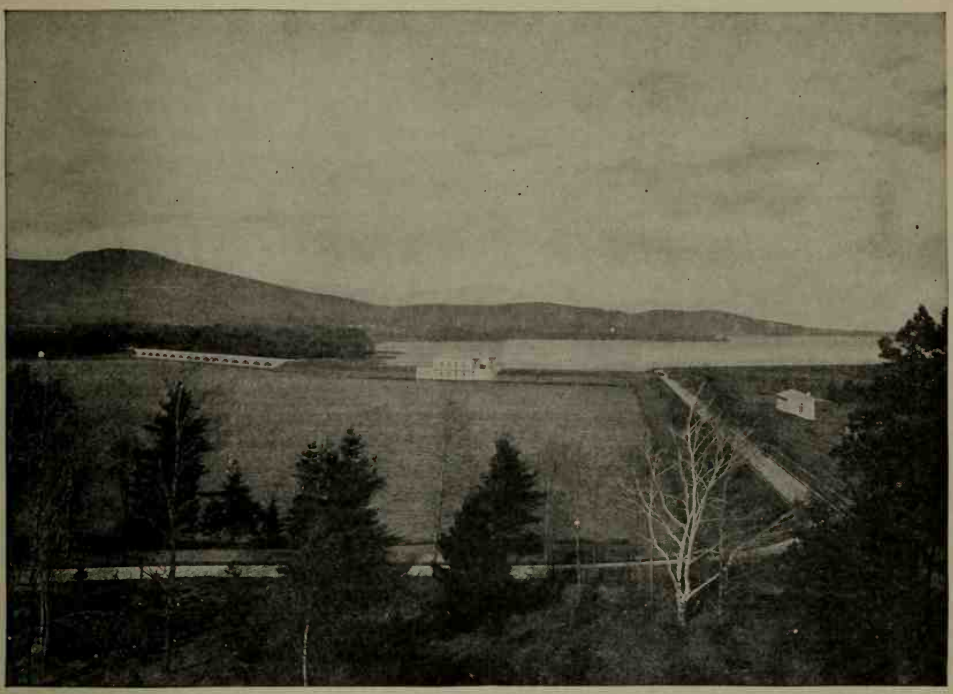
But when the city was reached the work grew even more interesting. The foundations of the great buildings go far down into the earth. Tunnels for railroads cross the city. Under every street is a tangle of sewers, gas pipes, water pipes, tubes for electric wires, telephone wires, and tubes through which letters are sent with the speed of an express train. None of these must be interfered with. Besides, the force of the water, struggling to break out, is enormous. If it should break out, men, horses, and buildings would be swept away by the terrible force of the stream coming from deep down in the earth.



The Kensico Reservoir is sixty-four miles below the great Ashokan Reservoir, and holds enough water to supply the city several months, if it should be necessary to shut off the water from that lake. This is the lower side of the Kensico Dam, showing the attractive park, which has been laid out. The reservoir is deeper than it would seem from this picture. A broad roadway runs along the top of the dam.

So the great underground river was carried far below the surface, so far, that there is always at least one hundred and fifty feet of solid rock above the imprisoned water. Along the path marked out for the tunnel, shafts were sunk deep down into the ground, just as was done where the water passed under the Hudson, and with dynamite and pick the way for the water was built. The broken rock was loaded into cars, brought to the foot of the shafts, drawn to the surface, and hauled away. As the digging went on, there came a day when the men from

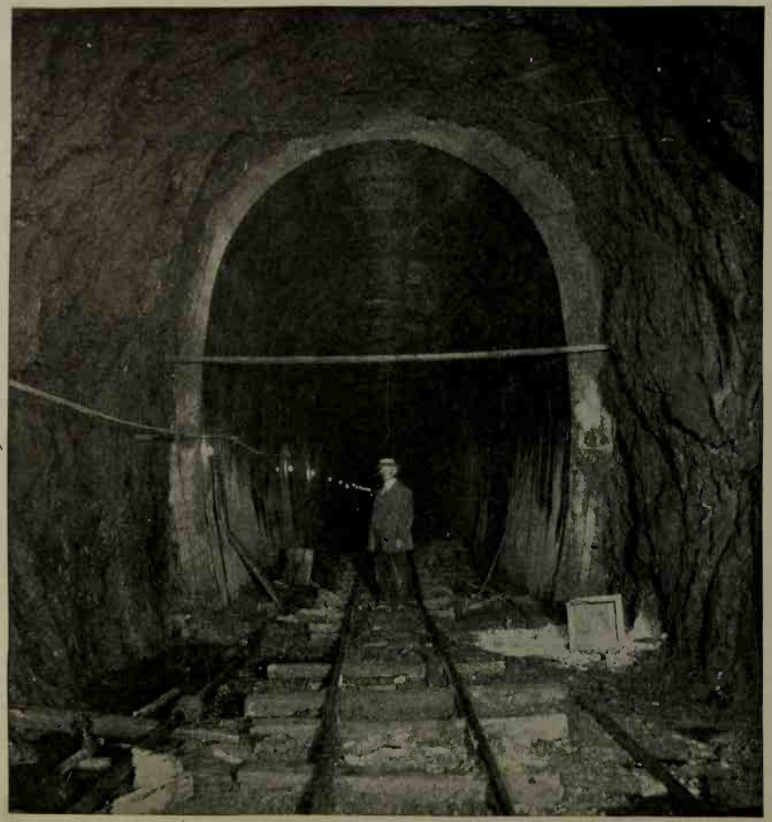
WHERE THE WATER BEGINS ITS JOURNEY



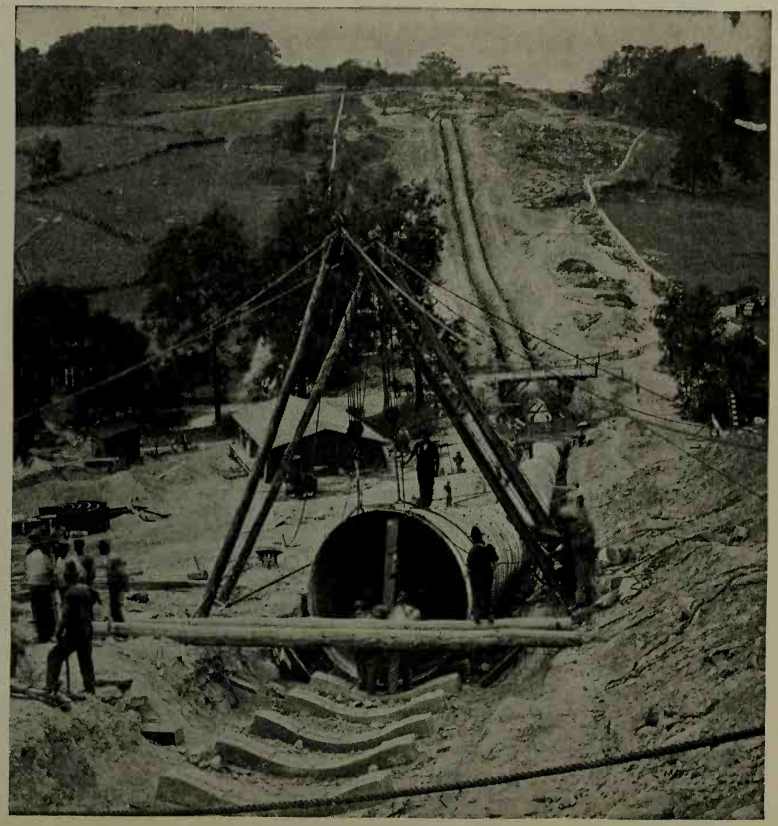
The great Ashokan Reservoir, a hundred miles from New York, is divided into two parts, both of which are seen in the picture. The West basin is the nearer, and the East basin is beyond the dividing dike and the Ashokan Bridge. A roadway crosses the reservoir here. Both basins together contain enough water to cover Manhattan Island twenty-eight to thirty feet deep. The white building on the dike is a gatehouse.

You have learned that oxygen burns up dead matter. At both the Ashokan and the Kensico Reservoirs, are aerators. Every drop of water, before it passes into the aqueducts, is thrown up in a fine spray, so that it comes in contact with the air. By this means, gases and vegetable matter which might give a slight taste or odor are destroyed. The aqueduct is under the building in the centre, and here the water starts.

THROUGH MOUNTAINS AND ACROSS VALLEYS



Twenty-four hills or mountains came in the way. Through them tunnels were blasted, and lined with concrete as you see in the picture. These tunnels were also 17 feet high as you can guess from the height of the man. Of course the track over which the cars ran to carry out the broken rock was removed and a concrete bottom was laid before the tunnel was joined to the aqueduct in the open.



Where the rock in a hill or in a valley is weak, steel siphons, 9 feet or 11 feet in diameter, carry the water. They are lined with cement and covered with concrete. Three of these would be required to carry as much water as the aqueduct holds, but only one is needed at present. When one of the siphons dips down into a valley the pressure of the water against the sides is tremendous.

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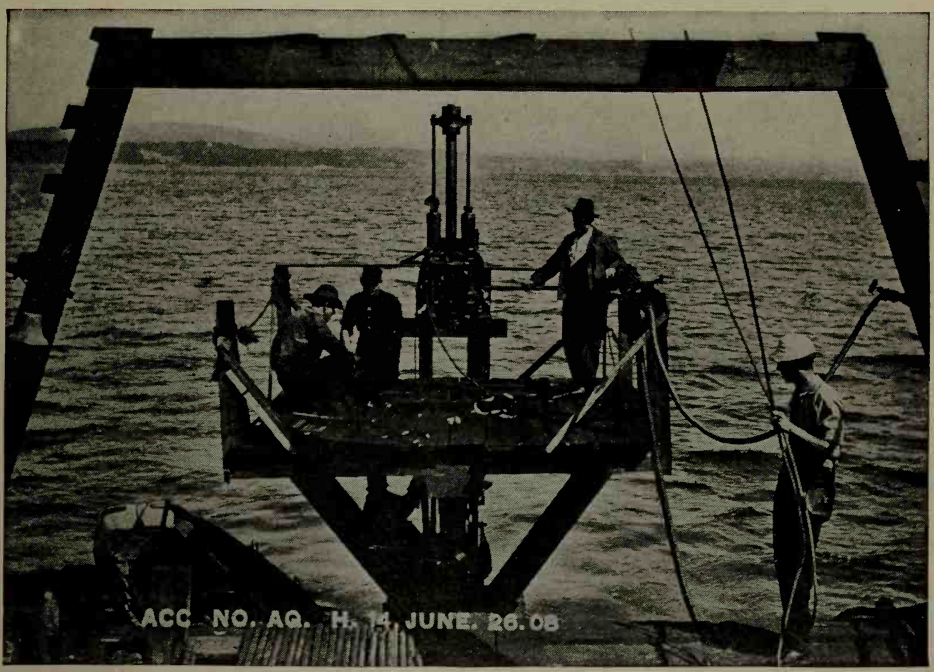
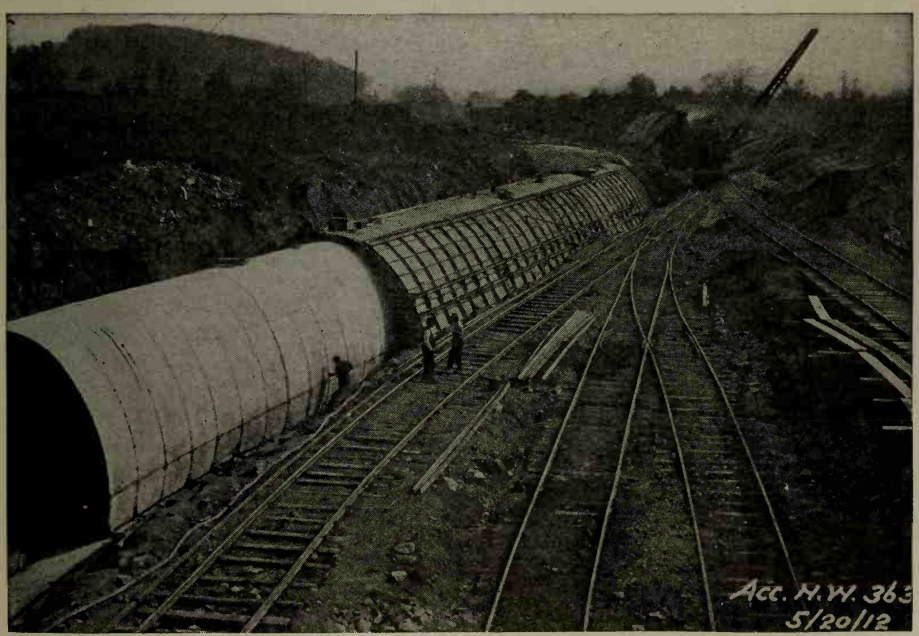
THE BEGINNING OF THE AQUEDUCT



When streams were to be crossed, a drill was sunk to find whether there was solid rock at the bottom. If so, a tunnel was built under the water. This shows men driving a drill diagonally toward the middle of the bed of the Hudson River. On the other side of the river was another drill and when the holes reached the middle of the river they were 1,500 feet below the surface. Leaning against the timber at the bottom are the cores of rock brought up by the drill.

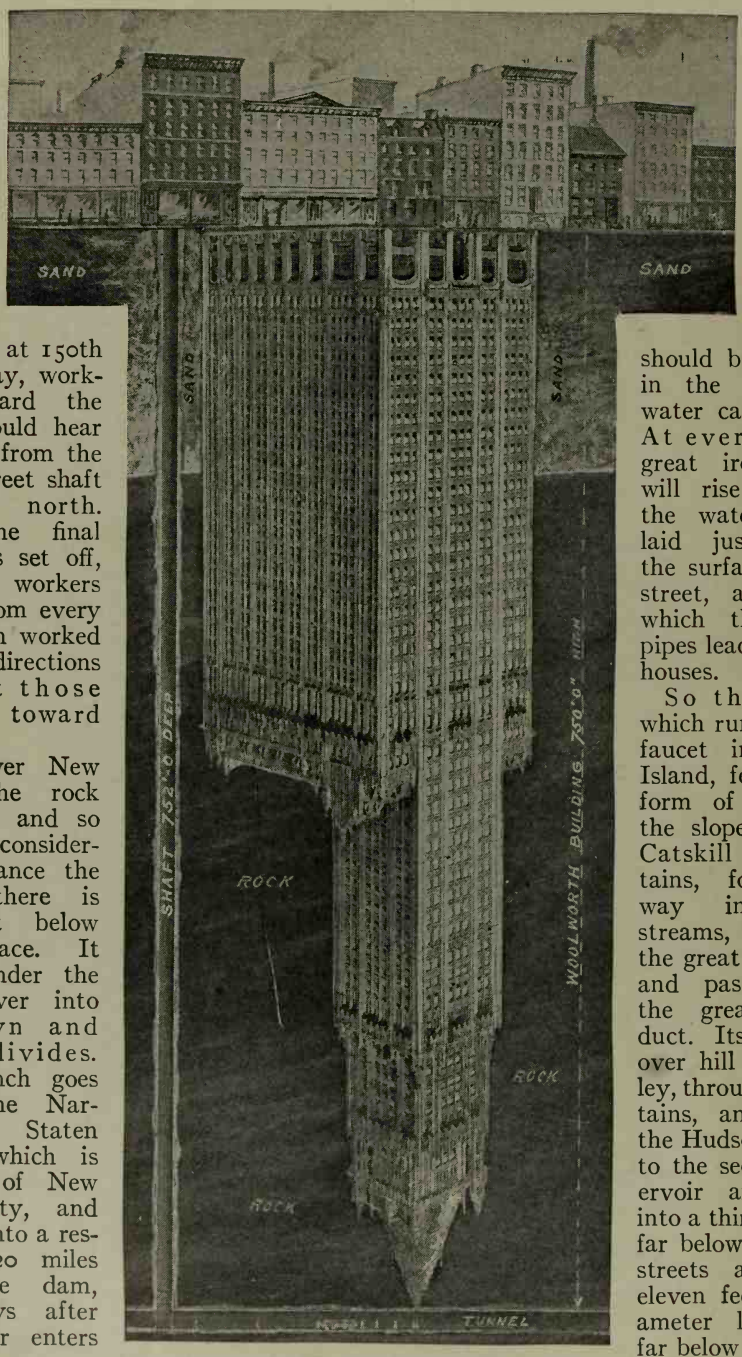


Where the slope is not too great the aqueduct will look like this. It is a great concrete horseshoe, 17 feet high and 17 feet 6 inches wide, resting on concrete foundations. In the lower part the walls are more than 5 feet thick. When completed the ditch was filled up and several feet of earth were heaped over the top. There are 55 miles which were constructed in this manner. On beyond you can see the aqueduct disappearing into the hill. On another page you can see how one of these tunnels through a hill or mountain looked before it was joined to a section just below the surface.

the shaft at 150th Street, say, working toward the south, could hear the men from the 135th Street shaft working north. Then the final blast was set off, and the workers met. From every shaft men worked in two directions to meet those working toward them.

In lower New York, the rock was bad, and so for a considerable distance the tunnel there is 750 feet below the surface. It passes under the East River into Brooklyn and there divides. One branch goes under the Narrows, to Staten Island, which is a part of New York City, and empties into a reservoir 120 miles from the dam, four days after the water enters the pipe.

This tunnel underneath the city is also lined with concrete, so that even if there



Picture by courtesy of the Scientific American.

The East River once flowed over the lower part of Manhattan Island and wore out a deep channel. The rock below is decayed and so it was necessary to sink the tunnel 752 feet below the surface. The Woolworth Building, upside down, would barely touch the tunnel.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 5317.

should be a seam in the rock, no water can escape. At every shaft great iron pipes will rise to join the water mains laid just under the surface of the street, and from which the small pipes lead into the houses.

So the water which runs from a faucet in Staten Island, fell in the form of rain on the slopes of the Catskill Mountains, found its way into the streams, then into the great reservoir and passed into the great aqueduct. Its way led over hill and valley, through mountains, and under the Hudson River, to the second reservoir and then into a third. Then far below the city streets a tunnel eleven feet in diameter leads on far below the East River and under New York Bay to Staten Island, the end of the marvelous underground river.

The glory of ancient Athens, once the finest city in the world, is represented to-day by a pile of noble ruins, and in this view we see the famous Acropolis, the hill on which many temples stood.

THE GLORY THAT WAS GREECE

CONTINUED FROM 5155

THEMISTOCLES

WHEN we turn to the map of the blue, sunshiny Mediterranean Sea, we notice that the most easterly of its three southward-pointing peninsulas is, in fact, a double peninsula. The southern one, called in ancient times the Peloponnesus, is shaped like a mulberry leaf and hangs by its stalk—the Isthmus of Corinth—from the northern one, which springs directly from the mass of the continent. Successive ramparts of mountains shut off the Peloponnesus and a strip of country the other side of the isthmus from the rest of Europe.

But this whole country of Greece, which is about the size of Illinois, lies open to the enticing sea of many islands, with its fine harbors and easy sailing. This sea was known in old days as the Ægean Sea; the lovely islands themselves are like stepping-stones between Greece and the opposite coasts of Asia Minor.

We read in the story of Persia, that begins on page 5145, with what gallantry and determination the Greeks defended their northern mountain walls during the world-struggle between the East and West in the fifth century before Christ. We know, too, how open to attack the sea-washed coasts were at that time, and how invaluable were the fine harbors, such as Salamis. But before throwing ourselves again into those thrilling times, let us wander back through the centuries to catch a few glimpses of the earlier state of the country. We want to see the beginnings of a race that played so brave a part in the day of its tremendous trial.

A poor, blind old man, we are told, though some would have it that he never existed, wandered round the coasts of the Ægean Sea, some three or four hundred years before the time when the whole land was in a turmoil, fitting out ships and gathering soldiers to resist the Persians. This old man, Homer, like other minstrels before him, sang or recited, as he went, the grandest songs of adventure and fighting that the world has ever heard. Homer nearly 3,000 years ago was handing down, as he sang, the history, clothed in a poetic dress, of times perhaps three or four centuries earlier than his own.

We read some of Homer's stories on pages 73 and 203 of this book, and in the British Museum and other great European museums there are

manuscripts, 2,000 years old, of the two great poems—the "Iliad," or the taking of Ilium, or Troy, and the "Odyssey," which tells of the wonderful wanderings of the great hero, Odysseus, but the time when Homer lived was many hundred years before that.

Once people thought that everything in the "Iliad" and "Odyssey" was fairy-tale, because there is so much in them that can be nothing but beautiful make-believe. Since the last half of the nineteenth century began, however, the spade of the explorer has shown how much truth and history lie hidden in Homer's songs. We know now that brilliant memories of times gone by are enshrined in the legends. Those times of which Homer sang had been wiped out by waves of newcomers and years of disturbance and struggle in the land.

THE PALACES OF THE GREEK HEROES THAT WERE HIDDEN FOR CENTURIES

In the north-west corner of Asia Minor, near the Hellespont, scholars believe they have found the ruins of Troy, or Ilium, itself, and in Mycene, in the Peloponnesus, they have unearthed a palace with golden treasure, like the home of Agamemnon, the leader of the Achæans who fought against Troy. Grand indeed is it to have actual touch with those far-off stirring times, and most deeply interesting are the remains to be seen in museums of pictures cut in roller seals or painted on plaster, as well as wonderful treasures of gold, such as ornaments and cups.

How long this civilization lasted is not yet known, but on many Mediterranean sites have been found widespread traces of it. In the beautiful island of Crete, for instance, stood a marvelous palace, three stories high, as large as a town, belonging to times still earlier than those of Mycene and Troy. The story of its exploration is one of the most entrancing ever told, especially as it unravels one of the wonderful old Greek stories, that of the monster Minotaur, and the labyrinth, or palace with winding passages, in which he lived.

THE MEN WHO SETTLED ON A STRIP OF LAND AND BECAME DARING SAILORS

It was during the years when this old civilization was flourishing round the Ægean Sea that many families of people were migrating westwards from their homes on the lower basin of the Euphrates, where life was so full and busy and there was constant need for more room. One of these families, known as the Phœnicians, settled, as Abraham of the same race had done long before, in Syria, the country between Asia Minor and Egypt. These Phœnicians occupied a narrow strip of land, about 200 miles long by about 20 broad, between the sea and the mountains of Syria, where grew the famous cedars of Lebanon. Energetic and clever people they were, and they became daring sailors and most successful traders. Placed midway between the East and West, they became the merchant carriers of the known world; the productions of the old empires on the Nile and the Euphrates passed through their hands, and were taken in their little ships wherever they could find a market.

Farther and farther afield they pushed their way, building forts to protect their trade, much as the Dutch, French, and British did thousands of years later. They were miners and metal-workers, too, and it was chiefly in the quest for silver that they passed the Pillars of Hercules and founded Gades, or Cadiz, facing the broad Atlantic. It was the rumor that tin was to be found in distant islands that led them to pass the Bay of Biscay and land in Cornwall. The Phœnicians discovered Britain.

HOW THE PHŒNICIANS BECAME THE MERCHANTS OF THE WORLD

These people are mentioned in the "Iliad" as famous workers in metal; in the "Odyssey," they are spoken of chiefly as daring sailors and pirates.

Like the Crusaders and the British in later days, they saw the advantages of Malta, and Cyprus, the copper island, for harbors and footholds, but their chief colony, which flourished exceedingly after the great days of Phœnicia had gone by, was Carthage, on the north coast of Africa, nearest to Sicily. So strong and rich did this colony become that it founded other colonies, such as New Carthage, in Spain, and contested long and nobly with the Greeks and Romans in later days.

And all the time that the Phœnicians were facing the waves in storm and sunshine, buying and selling everywhere, from the very old Greek cities and from Britain, and founding colonies, they were also making great wealth from a beautiful purple dye obtained from a little shell-fish

THE FAMOUS GAMES OF THE GREEKS

A leading feature of Greek life was the great Olympic festival, held every fourth year at Olympia, at which athletes, musicians, poets, and artists were present from all parts of Greece and contended for the simple prizes, that took the form of olive crowns. In this picture we see a victorious poet being carried in triumph.

Here is the end of one of the great foot races at Olympia. These Olympic games were not idle sport. They were dedicated to Zeus, and represented all that the Greeks held to be most worthy in human life. They were a part of the religion of Greece, and the sternest means were taken to prevent anything like cheating.

So sacred were the Olympic games considered by all the different Greek states, that if they were at war, the fighting was suspended during the period of the festival, and only resumed after the competitors had returned to their homes. Of all the Greek states none encouraged athletics more than Sparta, whose male citizens were rigorously trained by the State from the age of seven. Here we see the famous Spartan gymnasium.

gathered on their shores. It is astonishing indeed how much life and work had its home on that narrow strip of shore, especially round the two great cities Sidon and Tyre, both of which had afterwards very tragic histories. The name Tyre brings to mind its king, Hiram, who helped David and his son Solomon so much in the building of the great Temple at Jerusalem, by sending them cedar and bronze and cunning workmen, as we read in the Bible.

While the Phœnicians were thus at the height of their power, great waves of people had ever been rolling on from the east, round the Black Sea, pushing forward and southward the tribes in front of them. And so it happened that, some time after the fall of Troy, new states arose round the north-west of the Ægean Sea as new tribes seeking for homes arrived.

In the years of fighting and trouble which followed, the old high civilization was lost, and when at last things settled down, we find Greece—or Hellas, as the people themselves called it—cut up into small states, mostly shut in by surrounding mountains, but open to the sea.

THE QUARRELS THAT PREVENTED THE GREEKS BUILDING A GREAT EMPIRE

All were fiercely independent, and though the Hellenes were all of the same race, they were very different in nature. We know but little of the long struggles the newcomers had with the old inhabitants, the very early Greeks, or of the difficulties that arose as they mingled with them, and overflowed to the islands of the Ægean and the coasts of Asia Minor beyond.

The hree chief tribes of the Hellenes were the Ionians, the Dorians, and the Æolians. All through the history of the rise and fall of Hellas or Greece, these people never united under one ruler, as did the Anglo-Saxon kingdoms. Incessant and bitter to the very end were the quarrels and jealousies among all the states founded by them.

The chief Ionian state was Athens, with the country round called Attica, that little peninsula which lies north-east of Corinth. The Ionians soon spread out over the middle islands of the Ægean Sea to Asia Minor, where they founded the cities afterwards so famous as Smyrna and Ephesus. In the Peloponnesus was Sparta, the chief Dorian state; and it also soon formed settlements, chiefly in Crete, Rhodes, and Cyprus. To the west of Attica lay Bœotia, with its capital, Thebes, settled eventually by the Æolian family, neither so clever as the Ionians nor so brilliant in war as the Dorians, but more steady and persevering than either. They expanded to the north of the Ionians.

THE FALL OF TYRE AND THE RISE OF GREECE AS A SEA-POWER

The early settlement of the states is a long and intricate story, with many changes of government, and much fighting amongst themselves. Still, shut off in the peninsula by their triple rampart of mountains to the north, they had some centuries free from foreign invasion in which to develop according to their natures and the opportunities of their country.

The brilliant period of Phœnicia did not last many centuries. Nebuchadnezzar took Tyre in the sixth century before Christ, and the Persians annexed the whole district soon after, glad enough to get the use of the great fleets of ships for their wars and commerce.

As the sea-power of the Phœnicians went down, that of the Greeks rose, till they, in their turn, became masters of the Mediterranean. They traded and explored everywhere and founded colonies on a grand scale. Besides those to the east were the important ones in the south of Italy and Sicily, which came in time to be called Greater Hellas or Greece. From the colony at Marseilles, then called Massilia, three centuries before Julius Cæsar crossed the English Channel, sailed the ardent old sailor and geographer, Pytheas, to the distant island of Britain, then so lonely and savage. We read in the story of Egypt, that begins on page 4841, how much that country was influenced in its later times by Greek trade and Greek learning, when at last the persevering merchants had managed to gain a footing in the China of the Mediterranean

THE IRON LAWS OF SPARTA THAT TREATED MEN AS IF THEY WERE MACHINES

For a long time, one of the most powerful of the Greek states was Sparta, famous for her military laws which were said to have been framed by Lycurgus. These iron laws arranged the lives of Spartans from birth to death as if they were parts of a machine. Baby boys

SCENES IN THE GREECE OF LONG AGO

Homer, the blind poet of Greece, and perhaps the greatest poet of all time, is shown in this picture singing one of his famous epics. His poems, as Gladstone said, differ from all other poems, and are in themselves an encyclopædia of life and knowledge.

When the enemies of Aristides the Just induced the people to banish him from Athens, a peasant, wishing to vote for his banishment, and not knowing the leader, came and asked him to write the name Aristides on his voting-shell. This Aristides did.

Xerxes the Persian came to conquer Greece with a huge fleet of 1,200 large ships and 3,000 smaller ones, while the Greeks had only 366. So confident was Xerxes of crushing the Greek fleet at Salamis that he sat on a lofty throne to see their defeat; but the Persians were completely beaten. This battle took place in the year 480 before Christ, a few days after the famous fight at Thermopylæ. In this picture, by Ferdinand Cormon, we see how enthusiastically the Greek victors were welcomed by their friends after the battle.

were not allowed to live at all if they were not strong, and those who passed the judges were taken from their mothers when seven years old to be brought up by the State, that they might turn out fine soldiers. They lived in barracks in the hardest and simplest way possible, and were made to endure hunger, fatigue, and even thrashing. To this day we say of anyone who endures discomfort and suffering without complaining that he is a Spartan, and a proverb we often use, "Hunger is the best sauce," comes down to us from a Spartan cook who was speaking of the horrid black broth these boys had to take.

We read on page 1321, in the story of the pass of Thermopylæ, several hundred years after Lycurgus framed his laws, what sort of soldiers this military training turned out.

The Ionian Athenians developed on very different lines. They had many difficulties and troubles to endure before their laws and arrangements settled down into one of the most perfect systems of government by the people ever known. Their great reforming law-giver was Solon, one of the wise men of Greece, about whom we read on page 1321. He lived about one hundred years before the Persian wars began.

THE POETS AND HISTORIANS OF ATHENS WHO WROTE FOR ALL TIME

About this time, too, the great fable-writer, Æsop, is said to have lived. We have many of his delightful stories in other parts of this book.

The greater part of the wonderful influence that Greece has had on the world is due to the work, the writings, and the manner of life of the little state-city of Athens during a few hundred years.

Happily, we possess a great wealth of illustration to show us what manner of men these Greeks were, especially the Athenians. Many of their thoughtful writings, histories, plays, poems, and speeches have been handed down through the centuries by scholars who have loved them and studied them. Some of the old manuscripts of these are next to the copies of the "Iliad" and "Odyssey" in the British Museum. But besides these untold treasures, much beautiful handwork has been rescued and dug up in Greece and surrounding countries, and brought to museums where they can be set up and studied. Some of these treasures may be seen in the museums in our great cities.

It was the work of the Greek mind and Greek hands that began nearly everything great and beautiful that later days have carried on.

THE PICTURES ON THE VASES THAT SHOW US THE LIFE OF THE OLD GREEKS

From the earliest days the Greeks made fine pottery, and ornamented it with designs and pictures. The early, rather stiff work of the eighth and seventh centuries before Christ gave way to the interesting subjects chosen by the artists of the sixth and fifth centuries. First and foremost, we must notice the graceful and varied shapes of the vases, according to the use for which they were designed. Often the potter-artist signs his name on the vase, as well as the picture-artist. The subjects chosen for these are chiefly scenes from the old stories in which the religion and history of the country are so entwined, and scenes from daily life, especially in the fifth and fourth centuries before Christ, when vase-painting rose to its greatest perfection. After these times it declined.

Helped by the beauty of the clear skies, wooded hills, and dancing streams of Greece, the bright imaginations of its old inhabitants put life into everything around them. The dancing waves became merry maidens—even we talk of the foam as white horses—fairies and nymphs dwelt in every shady wood, in the sparkling water. We can find pictures on the vases to help us to understand a great many of the fanciful ideas in Greek religion. There is Zeus, the father of the gods, with his thunderbolts; the goddess of agriculture, Demeter, sending a messenger to spread the knowledge of wheat-growing over the earth, or standing as the sad mother saying farewell to her dearly loved daughter at the moment when the dark and gloomy Hades drives her away in his chariot to the wintry underworld.

LITTLE PICTURES OF BOYS AND GIRLS OF LONG AGO

Those illustrating daily life are equally delightful. The babies playing with carts and make-believe meals might be seen in any nursery to-day, and the little girls at their dancing lessons, the boys with more serious work, but not nearly so attentive

THE FINEST BUILDING THE WORLD HAS SEEN

The Acropolis was the glory of Athens, and the Parthenon, that crowns its heights, was the glory of the Acropolis. It has been called the world's finest building on the world's finest site, and by common consent it is the most beautiful building that the world has ever seen. It is now in ruins, but here we see it in its glory.

The Parthenon was a temple of the goddess Athena Parthenos, and, inside as well as out, was beautifully adorned with sculptures. But the greatest treasure of the Parthenon and of all Athens was the colossal statue of the goddess Athena in ivory and gold, the work of Phidias, one of the greatest Greek sculptors.

as the girls, seem just as real to us as to the artists who drew them.

On other vases we can see how the potter made his pots; how the girls spun the soft hanging material of which they made their pretty, simple garments; how they gossiped together as girls do now, while bringing water from the well. There are many entertainment scenes, too, where the guests are reclining on couches.

The beautiful pictures of ships recall the blue Mediterranean and the naval glory of Greece; and the scene of olive-gatherers reminds us of the numbers of olive-trees round Athens, which gave the valuable oil so much sought after.

Some of the larger vases were prizes for sports and games, won long ago and buried with the proud winner when he died. Often, however, the prize in the games was simply a wreath of leaves; this surprised Xerxes very much. At Athens the prize was one of the vases with some of the precious olive oil in it.

How Athens rose in glory from the ashes of desolation

And this leads us to the city of Athens, and its hill called the Acropolis, where the Persians destroyed the sacred buildings and slew the few hundred people who stayed behind when the rest fled to the ships. There is a blackened layer to be seen to-day when digging is done to a certain depth on the Acropolis—the relics of the ruin wrought by the Persian.

Soon after this war was ended, the Athenians, helped by three of their great men, Pericles the ruler, Ictinos the architect, and Phidias the sculptor, set to work with extraordinary energy to restore the mischief done by the enemy. It was a great opportunity, such as Sir Christopher Wren had after the Fire of London, and by degrees temples, such as the world had never seen before, rose up on the Acropolis.

There are models of this flat-topped hill of the city, as well as one of the most wonderful of the temples upon it, in some of our great museums and schools of art. For 1,000 years the Parthenon remained a temple of the goddess Athena Parthenos, and that is how it received the name of the Parthenon. For another 1,000 years it was used as a Christian church, and then as a Turkish mosque. Now it is one of the grandest ruins of the world, and the sculptures are studied by all who wish to understand the most beautiful ways of expressing the human form. As we gaze in wonder and admiration at the glorious figures of the gods and goddesses, we reflect what models Phidias must have had before his eyes.

The wonderful treasures of ancient Greece that we can see to-day

The various details of the frieze which runs round the outside of the temple give a glowing picture of the grand procession in which all Athens took part in the centuries of its greatness. The winners of the vases were there, as well as the gentle, modest maidens who had embroidered a beautiful robe for the goddess. There were, also, the splendid prancing horses, the musicians, the bearers of offerings, and the gentle animals for sacrifice.

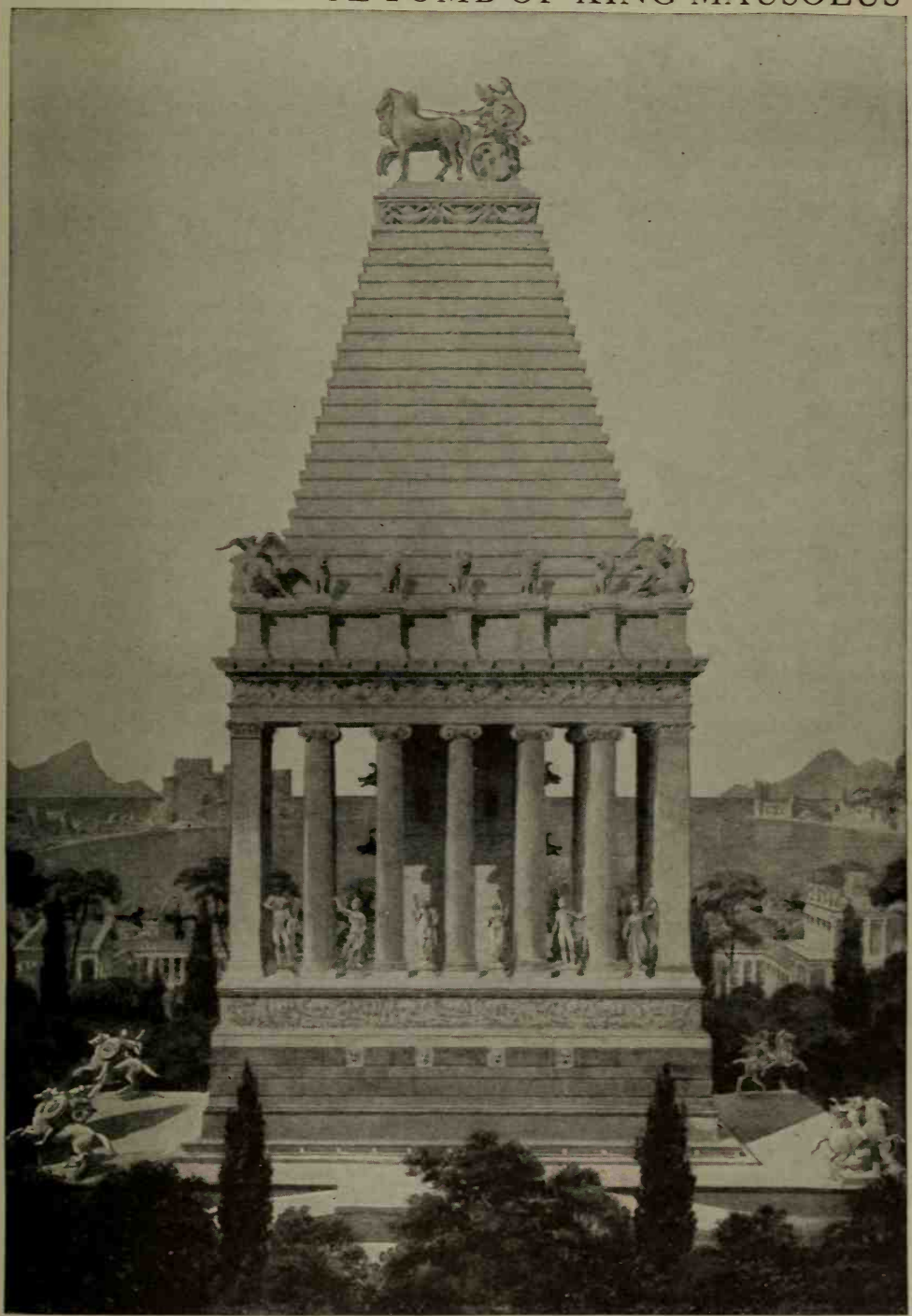
There were three statues of Athena on the Acropolis—a little old wooden one, supposed to have fallen from heaven; an enormous bronze one, seventy feet high, that the sailors could see and salute at sea, five miles off; and a gorgeous gold and ivory one, forty feet high, in the Parthenon, which is shown on page 5205. Then there was the equally large statue of Athena's father, Zeus, in the temple at Olympia in the Peloponnesus. It was at Olympia that the great national games were held, the prizes in which were so eagerly competed for.

In our museums we may see, too, remains of many other temples and sculptures, besides relics of bronze, and the exquisitely fine portraits on the coins and engraved gems. The work on the gems and the jewelry of the most notable period is so wonderful that its beauty is seen fully only by the aid of a magnifying glass.

Where we can see the toys of the children of ancient Greece

But perhaps the collection that makes us feel like intimate friends with the Athenians is that of the little figures in terra-cotta, called after the place where many were found, the Tanagra figures. Such pretty and graceful girls in life-like attitudes, playing games, reading, chatting, skipping, all so natural and homelike, we can scarcely realize they lived more than 2,000 years ago, and spoke Greek, not English. Anyway, we feel we could understand one of the babies when he wakes in the arms of his good-natured-looking nurse. He must

THE WONDERFUL TOMB OF KING MAUSOLUS



THE FIFTH WONDER OF THE WORLD AS IT PROBABLY APPEARED IN THE DAYS OF ITS GLORY

When Mausolus, the King, or Prince, of Caria, died, his widow, Artemisia, decided to erect in his memory the most magnificent tomb that the world had ever seen or should ever see. She employed some of the most famous sculptors of her time, and although Artemisia herself died before the tomb was finished, the sculptors completed it because they loved their work, and regarded this momument as the most glorious triumph of art that the world had seen. It is from this Tomb the word "Mausoleum" arose, which means a stately tomb.

have had toys to play with, like those in the room of Greek and Roman Life at the British Museum, where there are rattles, beside dolls with movable legs and arms, and marbles, and lesson-books for his elder sisters and brothers.

THE STRUGGLES OF THE GREEKS TO SAVE THEIR LAND FROM PERSIA

Not far from the toys are sling-bolts and other weapons from the field of Marathon. Often as one may read over again the story of the struggle, the wonder and the glory of it are ever fresh. We read the story of the devoted runner, Pheidippides, and his Marathon race on page 1819.

Then, again, there is the story of the gallant little town of Platæa, which sent its whole army of 1,000 men to face, with Athens, the hosts of the Persians, while other states were sending all sorts of excuses for non-appearance. Sparta could not leave the yearly games. This action of the Platæans has always been looked upon as one of the most heroic in Greek history, for what hope could they have had of winning?

While Xerxes was getting ready for the third invasion of Greece, there were busy times in the ports of Athens. Themistocles, one of the great men of the period, was doing his best to make Athens a great naval state by building ships with all the money that could be raised. We read on page 1322 how useful these ships were after Thermopylæ was forced and Athens burnt. They saved Greece at Salamis, defeating the great and powerful Persian fleet in the narrow waters before the eyes of the enraged Xerxes.

HOW THE GREAT ARMY OF XERXES WAS DRIVEN OUT OF GREECE

It is said that on the very same day that the battle of Salamis was fought, the Greeks who had settled in Sicily totally defeated the Phœnicians of Carthage, who had landed in their country. There were two other battles, both on the same day, in the following year. They were, firstly, the momentous battle of Platæa, when Greece gathered the largest force she had ever mustered to meet the picked men of the Persian army that Xerxes had left behind, and, secondly, the sea-fight across the Ægean at Mycale, between Ephesus and Miletus. Both resulted in victories for the Greeks; Xerxes troubled them no more.

If only the states could have united into one nation at this time, they would have had a great future. By defeating and driving away the forces of the mighty Persian Empire they had raised themselves from a collection of little states, with an independence depending on their position, to a place in the world as brave freemen among nations who were the slaves of despots. But union was never farther off.

The Spartans and Athenians remained sworn enemies, first one and then another gaining the lead. In the middle of the fifth century, when Pericles was rebuilding Athens and Herodotus was traveling and writing, Athens raised its power to a great height, but in so doing made bitter enemies of Sparta and Bœotia, and when these attacked her, little by little her possessions melted away. With her loss of power all hope of Greek unity was gone. Many were the battles and sieges, revolts and truces, in those days.

THE QUARRELS OF THE GREEK STATES AND THE DOWNFALL OF ATHENS

While Athens was on the down-grade, a great expedition was planned to retrieve her fortunes in Sicily, where Dorian settlers had grown very rich in Syracuse. But it failed utterly, and left Athens weaker than ever, with her best sailors and soldiers sacrificed in the ruin that fell upon her. After a few years she revived, and war with the Spartans now raged round the Hellespont. This time the Athenians were successful, and Byzantium passed to them from the Spartans; but the end of the war between the rivals was brought about by the capture of Athens after famine, during a long siege, had done its work. A miserable state of affairs followed.

It was now that the expedition of the 10,000 Greeks made its adventurous way into the heart of Persia, and then back by way of the Black Sea, as we read on page 5114. When their leader, Xenophon, reached Athens, he was deeply grieved to find that his friend and teacher, the great and wise Socrates, had been condemned to death. Socrates loved searching after truth and had a masterly way of cross-questioning his hearers that brought home to them their ignorance. His pupil, Plato, was an equally noble man, whose teaching will never die.

Just below the Acropolis was the

large open-air theatre where the prize plays of the great writers of Greece were performed to enraptured and critical audiences during the centuries so torn with wars and jealousies. To-day, 2,000 years after, we, too, are moved to tears and laughter when we see these great plays of the Greeks acted.

THE DANGER THAT THREATENED THE GREEK STATES FROM THE NORTH

The Spartans who had a turn of the chief power for a while, were greatly hated for their selfishness and hardness, and so the time came when they, too, lost their fine position and their navy; and then Thebes had some continued successes under their great leader, Epaminondas. When he died it was not the long-dreaded Persians who were now to be feared as possible conquerors of the disunited states of Greece. The danger came from an unexpected quarter, from Macedonia, on the northern and western shores of the Ægean Sea.

The Macedonians were in race a mixture of the Greeks and the less civilized tribes whom they called barbarians. They had long had their own kings, but little heed was paid to them by their southern neighbours. It was when a very clever and ambitious king, Philip, came to the Macedonian throne that danger began to threaten.

He drilled and improved his army, annexed the barbarian countries around him, and, by playing his game with wonderful craft and skill, he took advantage of the weakness and quarrels of the Athenians, Spartans, and Bœotians, and in the end, won the great aim of his life, the headship of the Greek states.

Demosthenes, the fine orator, who saw through his plans and wiles, was his chief enemy. In the assembly at Athens he thundered forth again and again in stirring speeches that have come down to us, trying to persuade his countrymen to change their ways before it was too late.

THE DARK DAY WHEN THE FREEDOM OF GREECE PASSED AWAY FOR EVER

In the final battle of Chæronea, Demosthenes, though forty-seven years of age, fought in the Athenian ranks. Imagine his feelings on the evening of that awful day. The Athenians lost 1,000 men on the field, and 2,000 were prisoners in Philip's hands. The flower of the Theban army died to a man where it stood. The freedom of Greece was gone, and the outward glory of Athens was laid in the dust. Great as Philip was, for he had raised Macedonia from being a small, half-barbarous state to the headship of Greece, he had a still greater son, Alexander, whose extraordinary career of conquest, we read in the story of Persia, that begins on page 5145.

Demosthenes proposed and carried a vote of thanksgiving when the news came of Philip's death. But Alexander crushed all hopes of freedom in Greece, and quickly showed his wonderful military genius in a campaign in Thrace. And then he set out on larger expeditions, till all the known parts of Asia and Africa were his, and he only longed for more worlds to conquer.

After his early death there was long fighting and confusion as to who should succeed to the great empire that he had built by conquest, and at length three separate kingdoms arose on its ruins. Macedonia with Greece fell to Antigonus.

HOW "CAPTIVE GREECE LED CAPTIVE HER PROUD CONQUEROR"

About a hundred years later, 168 years before Christ, Macedonia was made a Roman province. Twenty years after that, Corinth, the busy trading Panama of Greece, was taken, and Greece itself was made subject to Rome. But, as one of the Roman poets has said, "Captive Greece led captive her proud conqueror."

Rome had for years been learning from the art and literature of Greece, and when the conquest came, celebrated by long triumphant processions in Rome, instead of the usual train of vanquished kings and queens, strange beasts, and a great show of barbaric splendour, there passed before the Roman people the grand, silent forms in marble and bronze, the beautiful art treasures of Greece, torn from shrines and temples to adorn Roman cities, and to serve as models to the whole world.

Alexander had done his share in showing Greece to Asia, but it was chiefly by means of the Roman arms that the knowledge of Greek art and Greek learning was carried beyond the narrow borders of the little peninsula. In fact, Greece then became a "country without borders," and her wonderful influence and power are felt in a hundred ways all over the world in the present day.

THE NEXT STORY OF COUNTRIES IS ON PAGE 5271.

THE SPREADING SEA LAVENDER

There are several kinds of sea lavender that grow on our coasts, but this is the common variety. It is found on muddy shores. The flowers are bluish purple.

THE SWAMP LOOSESTRIFE

These spires of pale-yellow, red-eyed, tiny blossoms prick out of mossy bogs. In the fall little bulbils in the axils of the leaves drop off and sprout.

THE SEASIDE GOLDENROD

This member of the goldenrod growing near the sea can be recognized by its fleshy, smooth leaves with unbroken edges, and the heavy shapely flower-heads, with large, golden flowerets.

THE ROCK SAMPHIRE

The fragrant rock samphire, with its thick and fleshy leaves and stems, is used for pickling and makes an excellent relish. Samphire is a corruption of San Pietro, the Italian name, meaning the herb of St. Peter.

THE FLOWERS OF THE SEASIDE

CONTINUED FROM 5092

ALTHOUGH there are many plants that flourish only within a few miles of the sea coast, there are some so fond of sand and salt water that they naturally grow at the water's edge, or in the salt marshes. Some of them, indeed, are half covered by high tides.

Very many of the plants that thus hug the coastwise beaches have one marked trait, whether they grow in the narrow strip of sand and gravel between the sand-dunes and the seaweed and other jetsam left by the highest waves, or in the ill-smelling, black, salty mud of salt marshes. This is the interesting fact that their foliage, as well, often, as the stem, is very simple in outline, and so glossy and smooth as to feel almost greasy. Many of them are thick, or "fleshy," like the cactus, and some are so swollen as to be quite like cylinders. This is also a characteristic of plants growing on deserts and saline soils, and is a device for securing as small a surface as possible, so as to prevent the precious water in the tissues of the plant from escaping too rapidly through the pores provided for that purpose in the surface of every leaf; for the plant on the sea-beach, as well as that on the desert, must be able to grow in sand so hot that one can hardly step barefooted upon it, and through which such rain water as falls quickly seeps away. Therefore, those plants that have gradually come into the possession of foliage that is able to retain such water as may come to it in the top, are most able to survive in such unfavorable localities in spite of the attacks of the sun and drought.

But these crisp, fat, watery leaves, called "succulent" in books, are tempting to browsing animals, and often these plants are tart, or salty to the taste, while others are very thoroughly and wickedly protected with an armor of most surprisingly sharp prickles.

THE LONG ROOT OF THE SUCCULENT SALTWORT

The saltwort is a striking example of both of these traits. It also has another somewhat common characteristic of sand-loving plants,—a long, spindling taproot from which the reclining branches spread in a great circle, forming a huge rosette on the strand; the foliage, to all outward appearance, being merely swollen, fleshy supports for needle-pointed spines that occupy all the available space. In the axils the fruits are crowded, each having quaint wings flaring horizontally

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from the apex. The saltwort belongs to that great goosefoot family which includes the useful vegetables, spinach and beets, as well as certain maritime plants.

THE GLASSWORT TURNS SCARLET IN AUTUMN

Not far from the saltwort, in the low grass, where high tides may flood them, stand ranks of a closely related plant, the glasswort. Brittle, smooth, spineless and to all appearance leafless, they bristle in the green herbage like skeleton plants from which the leaves have all fallen away. As a matter of fact the leaves have been reduced to mere scales on the round, upright branches. In the axils of the upper ones, minute flowers are sunken. In summer the glassworts are green, but as autumn approaches they become brilliant scarlet in color.

THE SAMPHIRE, A QUAINT PLANT OF ROCKY SHORES

The name "samphire," occasionally applied to the glasswort, has been borne much longer by a European plant of rocky shores, a rather quaint umbel-bearer, whose solid stems and leaves become swollen and juicy. In some seaside places it has been so much gathered for making into a pickle that it is no longer to be found. We might think it is a plant without leaves, for it appears to be merely a much-branched and twiggy stem with umbels of yellow flowers. As a matter of fact the flowers are white, but are very small, and do not show up so strongly as the yellow pistils and footstalks, and the blue-green leaves are so cut up into slender, fleshy, lobed leaflets as to resemble twigs.

SEASIDE HERBS INTRODUCED FROM EUROPE

To return to our goosefoot family, we find in it the orache, a pot-herb, growing originally on European sea-beaches, and only seldom found in our gardens; and also the fleshy, glaucous sea-blite with three-angled leaves, a bushily branched herb, which grows indifferently on sandy or muddy beaches, or in the salt marshes.

When we leave this family and its queer plants and unattractive flowers we are relieved to discover more showy maritime vegetation. There is, for instance, a pretty European shrub belonging to the oleaster family, which we sometimes include in our shrubberies, but which is not native to our coasts. It has drooping branches covered with egg-shaped or lance-shaped leaves, that are dull green above, and silvery white beneath, and is called the sea buckthorn, or sallow-thorn, some of its branches being short, and ending in long spines. It bears orange-colored berries, which are tart.

TAMARISKS AND SEA-HOLLIES

Other European shrubs sometimes growing into small trees are the tamarisks, with wand-like pink-flowered branches, and the so-called sea-hollies. One that at home grows on the sand above high water, has a short, thick, branching stem, with broad, roundish leaves that are thick and leathery, and their margins are cut into bold teeth that end in very sharp spines. They are of a gray-green tint, and have the appearance of a "bloom" upon them.

THE ROOT OF THE MARSHMALLOW WAS USED FOR CANDY

The pretty, furry marshmallow, that is very closely allied to the hollyhock, is sometimes found naturalized in our salt marshes, escaped from cultivation. Its roots contain a sort of gum or mucilage, from which the sweetmeats were originally made.

THE SEA-CAMPION GROWS ON EUROPEAN CLIFFS

Another European plant that grows about the cliffs, and on the edges of fields that may be above them, is the sea-campion, which has similar leaves and flowers, but the stems are less erect stems than those of the bladder campion, and the white petals are somewhat broader.

THE SEASIDE CONVOLVULUS OF EUROPEAN SHORES

Another plant that we should recognize if we were abroad is the European seaside convolvulus, because its flowers and leaves are similar in shape to those of the field convolvulus, or small bindweed. Its slender stem runs underground like that of the bindweeds, but is shorter and rarely twines around other plants.

THE HORNED POPPY, A TRAVELER FROM EUROPE

On the European sand-dunes, grows the fine horned poppy, with bold, glaucous leaves and rich yellow flowers, three or four inches across, which occasionally occurs in America as a visitor from abroad, springing up in waste places. Instead of its seed-vessels being of the shape of our old red-flowered friend of the cornfields, the horned poppy pod is a slender, curved horn, a foot in length.

THE ORACHE

This common weed of the seashore, where it grows in abundance, flowers from July to October, and the whole plant has a reddish tinge. The central branch is erect, while the others look as though beaten down.

THE YELLOW HORNED POPPY

On sandy or chalky beaches the horned poppy is conspicuous with its large, rich, golden-yellow flowers. The seed-pods that follow the flowers are very long, and might be mistaken for leafless flower-stems.

THE COMMON TAMARISK

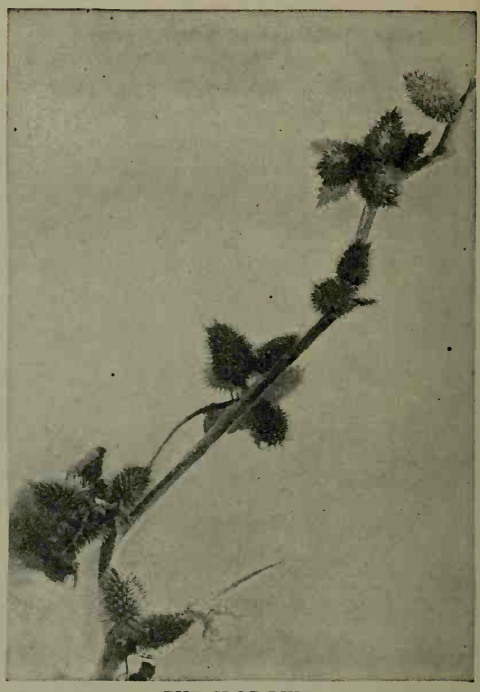
This fine evergreen shrub, with its fine rose-colored flowers, has a light, feathery appearance. It is largely used as a hedging in seaside gardens, as it withstands the strong salt winds and protects other plants.

THE JOE-PYE-WEED

This great swamp-weed is said to be named for an old Indian, who recommended it for its medicinal virtues. The flaring outline of the stem with leaves and flowers has suggested the name of trumpet-weed.

THE GROUND NUT

There are several plants known by this name, but this plant belongs to the pea-tribe and furnished food for both the Indians and explorers.

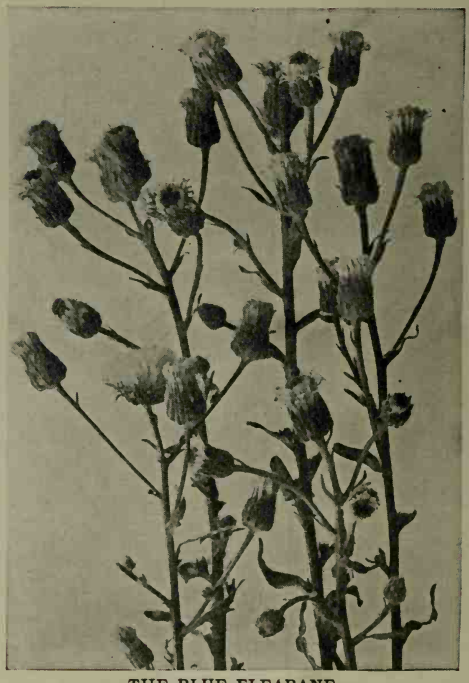


THE CLOT-BUR

This odd-looking bush has wide-spreading branches, bearing tufts of many-angled velvety leaves, and curious flowers, succeeded by brown prickly fruits.

THE RED BARTSIA

This plant is by no means confined to seaside districts, but grows in waste places and fields all over Britain. The reddish-green leaves and the small pink flowers give the whole plant a reddish look.



THE BLUE FLEABANE

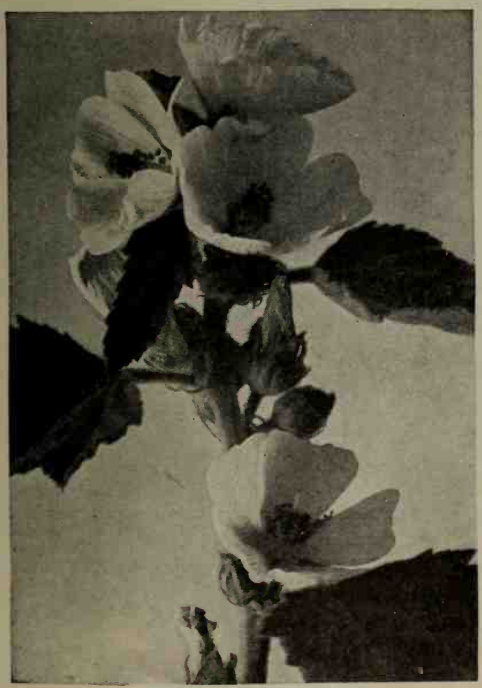
Though this plant is not a seaside flower, it may often be seen growing near the sea on such places as old walls and other dry spots. The plant is very much branched and very hairy. It is rare in Europe.

THE BAYBERRY

These shrubs are conspicuous as masses of dark-green, aromatic foliage, growing on sand-dunes along the Atlantic coast. The berries show in winter.

THE MARSH ELDER

A tall, glossy-leaved plant is the marsh elder, growing in great clumps along the muddy banks of tidal rivers and shores, with green, tassel-like flowers.



THE MARSH MALLOW

The common marsh mallow grows on marshes near the sea, and is a mass of blossom in August and September. The flowers are large and rose-pink.

THE BEARBERRY

This evergreen creeps over large areas of sandy soil, upholding its waxen, urn-shaped flowers, and large, scarlet berries on slender, woody stems.

THE MILKWORT IS A SEASIDE PRIMROSE

The sea milkwort, or black saltwort, is a sea-beach succulent plant of both the Old World and the New, blooming early in summer. It is a member of the Primrose family, and would be more fitly named the sea pimpernel. Though its stems are six or eight inches long, we shall not find them reaching that height above the rock, for they are much inclined to trail or to take a half-erect position. The small, oval, stalkless leaves are in pairs, and each pair is at right angles to the pair above or below it. The flesh-colored, crimson-dotted flowers are without stalks. It is the bell-shaped calyx that is colored, for there are no petals.

THE SEA-PINK AND SEA-LAVENDER

In the Plumbago family, very closely related to the primroses, is the dainty sea-pink, or thrift, of both worlds but found only far north in America; and the sea-lavender, which is very common in our muddy salt marshes. Here, again, we have the fleshy leaves, oblanceolate, large, and spreading in tufts from a thick rootstock. Above them, borne on tall, slender scapes, the widely branching flower-heads look like shreds of fog caught on the meadow grasses; for the tiny flowers sit erect in little one-sided spikes on the fragile sprays of the panicle, with hairy, pale-lilac petals and calyces of paper-like sepals. Long after they have ripened their seeds, the flowers still retain their form and some of their color.

ASTERS OF THE BEACHES AND SALT MARSHES

Down in the marshes with the sea-lavender several little asters, with slender but fleshy leaves, bloom gaily. Another aster with stiff stems and rigid leaves standing out in all directions springs from the sandy beach, and is topped by large and brilliant lilac flowers. Later than these, however, we find in the salt marshes a fleshy-leaved form of aster, known as the New York aster, which has very pretty blossoms with rays of palest violet.

THE SEASIDE GOLDENROD AND JOE-PYE-WEED

Near them, at the edge of the marsh, stand the very handsome seaside goldenrods with stout stems, plentifully furnished with shining, fleshy, smooth-edged leaves. The flowers are unusually large, of a rich golden color, and bloom on the upper sides of the down-curving sprays of the great panicle. Of course, both of these belong to the Composite family, and so also does the Joe-Pye-weed—a great plant that is common in swamps throughout eastern North America, but is particularly rampant in salt marshes. It grows over six feet high with a strong purplish stem rising through whorls of great, long-pointed, toothed leaves, and branches at the top, thus forming a massive pyramid of dull-purple or old-rose flower-heads, that makes it the most striking plant of the marshes even when in fruit.

THE MARSH-ELDER GROWS ON MUDDY SHORES

The quaint name of the high-water shrub or marsh-elder, gives a broad hint as to where it may be found. In fact its sturdy stems spring up just out of reach of the waves on muddy shores. It keeps its glossy, deeply toothed leaves late in the fall. They are somewhat fleshy, and grow smaller and smaller towards the top, until on the flowering branches they are very slender and short, and from their axils droop little heads of green flowers protected by a so-called circle of bracts. The shrub has a disagreeable, rank odor, and looks very much like an overgrown ragweed. This is not surprising, for it is a member of the ragweed family. Another member, and one which promptly calls attention to its presence, is the beach clot-bur, that has zigzag branches with unshapely, rough green leaves, and firm oval burs clustered in the axils, very completely provided with hooked, hairy prickles, as well as a pair of stout, hooked beaks at one end, by means of which they cling persistently to an animal's coat, or to clothing, thus being transported for some distance, and scattering the seed over a wide territory.

THE ODOROUS LEAVES AND BERRIES OF THE BAYBERRY

On the beach, on the sand-dunes, and even far inland, one sees the rounded bushes of bayberry, or waxberry. Its rigid, dark green, dull, oblong leaves are resinous and very aromatic, in odor a little like the bay or laurel, as we will discover by crushing them. When the leaves fall, one can see the ripened berries, or drupes, clinging closely to the stems. They look very white, but pick one and scratch it a little. You will find that the

THE SEA MILKWORT

Another name for this plant is the black saltwort. It grows on the low rocks that are splashed by the sea and in salt marshes. The pink flowers with tiny crimson dots are succeeded by fruits like those of the primrose.

THE SEA CAMPION

The large white blossoms of the sea campion show up well against the shingle of the coasts of Europe where it blooms all the summer. It is very like the bladder campion, or white bottle, of the fields and hedges.

THE SEA CONVOLVULUS

The sea convolvulus of Europe is a beautiful plant, with pale rose-colored flowers, striped with red or yellow, almost as large as the great bindweed's. The blossoms open in the morning and close at night.

THE SEA HOLLY

The sea holly, with its grey-blue flowers, is also called the sea eryngo. It is a stout, prickly plant, with the appearance of a thistle, although it really belongs to the parsley family. The roots are eaten candied.

THE SEA BUCKTHORN

The sea buckthorn is a bushy shrub with leafy branches which end in thorns. The leaves grow on short stalks, and are dotted above and silvery below. The flowers are green, and the orange-colored fruit is acid.

THE GLASSWORT

The jointed glasswort, or marsh samphire, is abundant in salt marshes around our coasts, and is sometimes used for pickling in place of the samphire, some people preferring it. It was formerly used in making glass.

THE PRICKLY SALTWORT

This hairy and much-branched plant, with its striped and angular stem and prickly leaves, rarely grows higher than a foot. It is common on sandy shores, and was once much used in preparing sodium carbonate.

THE SEA BLITE

Like the saltwort and the glasswort, the sea blite yields an impure sodium carbonate, formerly much used in the manufacture of glass. It is common on muddy seashores, and has a reddish hue in winter.

whiteness can be scraped off, and that the berry is really dark colored and very wrinkled, and the white substance that covers the berry lies thick in these creases. It looks like, and is, vegetable wax, which without doubt acts as a waterproof coating and prevents the rain and snow from injuring the berry as it clings to the stem during the winter. This wax was utilized by early colonists, who boiled great quantities of the berries, and made candles from the melted wax that floated to the surface. When blown out the pale-green candles exhaled a delicious spicy fragrance.

KINNIKINNIK, THE PLANT WHICH WAS SMOKED AS A TOBACCO

A very widely distributed plant in the colder regions of the northern world, is the bearberry of the Heather family. Although it is quite common inland, it grows very often on the bluffs of the northern sea-coasts, where its creeping stems gradually overgrow large patches of sand for the comfortable ripening of their bunches of scarlet berries, greatly relished by game-birds. The berries and the pale, waxen flower-bells before them, droop close to the earth under the tufted, tough, little spatulate leaves that terminate the trailing branches. The plants have been used for tanning, and not only do they furnish a drug, but when dried were used by Indians as a tobacco to be smoked alone, or added to the ordinary kind, whence the plant is called "kinnikinnik."

THE GROUND-NUT WAS EATEN BY THE INDIANS

Still another plant of great value to the Indians was the ground-nut. Like the bearberry it is often found far inland, but in moist rather than dry soil. It seems to be particularly prevalent along the coast, just keeping clear of brackish water; and roadside thickets are wreathed with its far-reaching, twining vines, and fairly smothered with its balls of dull-purple and old-rose pea-like flowers that are curiously twisted and give out a delicious odor of violets. Its chief interest, however, lies in the dusky-skinned squarish tubers that sometimes are as big as pecans, and often lie in strings like the beads of a necklace, separated by slender rootstocks. These were a favorite food of the Redmen, who resorted in parties to the swamps where they could find quantities of these strings easily to be dug up. They probably tasted not unlike potatoes when boiled.

They were about the only food that the Indians, and their white captives, and the missionaries who lived among them, could find in times of famine.

The Indians also liked wild fruits. They ate them fresh, put them into their porridge, and dried them for pemmican. They were especially fond of plums, and doubtless made many excursions to those shores where the beach-plums grow, in spring wreathed with small white flowers, and in the fall, strung with quantities of puckery, rather acid fruit. We can imagine that the children played with the pits, and we know that their elders gambled with them. Nowadays, delicious jam is made from the thin flesh of beach-plums.

Near these low shrubs will be found the thick groundsel-bushes, or Baccharis, in the fall whitened by countless tufts of silk-like threads, which grow on the seeds, and are meant to cling, like cotton-fluff, to passing animals. The fruits are carried on the wings of the wind. Near by one can find on hot sand-dunes, violet-colored asters with thick fleshy leaves and the aster-like sandpaper plant with narrow foliage, rough as a file. In moister land grow the low sabbatias, with flesh-pink flowers like stars, with inner stars of deeper color painted on the bases of the petals.

THE SEAWEEDS LIVE ALMOST ENTIRELY IN WATER

While we are on the shore, we shall, of course, become interested in the seaweeds. As they are not flower-bearers, they scarcely come within the bounds of this article. They are plants that live almost entirely in water, reproducing themselves not by seeds, but by minute pores that cannot be seen without the aid of a microscope. Those which grow attached to the rocks inshore get uncovered at low water for a few hours at a time, and if the tide did not come back soon they would dry up and be killed. These seaweeds have no real roots, for what look like roots are only suckers that hold them fast to the surface of the rock; they never penetrate it, and they draw their food entirely from the water through the surface of their fronds. The large ones attached to the shore rocks have thick, leathery fronds of an olive color.

THE NEXT NATURE STORY IS ON PAGE 5227

SKATING ON THE WIDE STRETCHES OF THE ST. LAWRENCE

By December the ice on the St. Lawrence is strong enough for skating. Snow covers the ice, but every town clears its portion of the river, and young and old, from the American and Canadian shores, turn out to join in the sport. In the evening, masquerade skating parties are often held by the young people, and the shores are brilliantly illuminated. Hockey matches and ice-yachting races are also held on the frozen surface of the great river. These outdoor sports in the bracing cold help to make the young men strong and able to endure hardships.

Photograph by Brown Bros.

WHAT THIS STORY TELLS US

WINTER in the greater part of Canada is long and cold, but it is a time of enjoyment for young people. The air is dry and bracing so that the cold is not felt so much as in damper climates. People dress warmly and go out to work and play even when the temperature is many degrees below zero. Nowhere in the world is the winter more enjoyable than in Canada, and this story tells you of the great number of healthful sports in which young and old indulge. Most of them of course are for young people but all can enjoy a sleighing party, and quite old people find pleasure in skating and curling.

WINTER SPORTS IN CANADA

CONTINUED FROM 4839

VOLTAIRE, when once asked if he knew anything of Canada, answered, "Canada? Yes, a few arpents of snow." This idea prevailed in Europe for years. No country, with the exception of Siberia, was so long misrepresented. Only a few years ago Rudyard Kipling called her, "Our Lady of the Snows."

Canada lies partly in the Arctic region, where ice, frost and snow rule supreme for seven or eight months in the year, but it is unfair to take this section of the country as an example of Canadian climate. In Ontario along the Great Lakes the climate is milder than that of New York City, while in certain parts of British Columbia it is milder still.

About the middle of November, in the colder parts of the country, the small streams commence to freeze over and there is an occasional flurry of snow, but the chances for enjoyment do not vanish with the coming of frost. On the contrary they are increased by the tingle of the icy wind and the crunch of the snow under foot. The cold sets every nerve tingling. Action is what one craves and action one will have. With this comes a thrill so intense that you care not for the needles of frost or the cutting north winds. Kipling brings this out when he answers for the small boy of Quebec.

"When asked, 'Are you friz?'
Replied, 'Yes I is,
But we don't call this cold in Quebec.'"

By December the first, ice is strong enough for skating. This is the opening of the season, when Canadians become most enthusiastic. They are greatly devoted to out of door exercises and all kinds of field sports. People do not complain of the cold, because upon it depend all the winter amusements.

SKATING IS THE GREAT WINTER AMUSEMENT

Of these skating is the king of winter sports. Young and old rejoice when the ice will safely carry them, and it would be a novelty to find a Canadian boy or girl who does not know how to skate. Snow covers the ice, but every town has its covered rink. Masquerade skating parties afford no end of fun and amusement, while nothing delights the small boy so much as a game of shinny.

COASTING, A FAMOUS SPORT FOR GROWN PEOPLE AND CHILDREN

At the first fall of snow fun increases. Boys and girls get out their sleds and the hills are black with a merry crowd of rosy-cheeked children. Coasting vies with skating in its popularity. During the evening, the grown people take the place of children, and the "bob" that of the sled, and the fun continues. Coasting on "bobs" is really dangerous, and serious accidents sometimes happen. Boys did not always have fine sleighs for coasting. In the days of George III they coasted on sleds made of a small board with beef bones as runners.

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SLEIGHING AND SNOWSHOEING ARE POPULAR PASTIMES

Sleighing is a very enjoyable pastime of winter. The jingling of sleigh bells is constant music heard throughout the cold winter months. Young and old find much pleasure in sleighing parties.

By the middle of January, the snow is piled to the fence tops and roads are blocked. Then the snowshoer is in great glee. The shoe is made of thongs of rawhide fastened to a frame of tough, light wood. The shape of the netted part varies in different sections of the country, but the principle of construction is always the same. In wooded districts the wooden frames are frequently oval, but sometimes round. The most popular shape in Canada has narrowed and almost square toes turned up a few inches, and the oval ends in a long tail behind, looking not unlike a tennis racket. The shoe is about three feet long and thirteen to sixteen inches wide. The wearer uses moccasins and straps the foot in the centre of the oval. Snowshoes are a necessity in many places, a convenience in others, and a great aid to winter sport wherever snow is deep enough to use them. Snowshoeing is one of the most fascinating sports, and many towns have their snowshoe clubs. Its members enjoy many a tramp over thickly covered fields, or hold races. The snowshoe was invented by the Indians.

TOBOGGANING A WINTER SPORT LEARNED FROM INDIAN CHILDREN

Another popular sport that the Indians have given to the Canadians is tobogganing. When the first settlers came to Canada they were amused to see little Indian children sliding down hills on flat pieces of wood strapped together and turned over in front. The present toboggan is modeled after the old Indian type. It consists of several narrow pieces of well-seasoned ash bound together and strengthened by several narrow cross pieces. The front is curled like a scroll. Along each side is a rail to which the riders may cling. A toboggan is about six feet long and eighteen inches wide. In order to add excitement long chutes are built for slides. Some are frequently sixty or more feet high, with an incline of forty degrees, and so constructed that there may be a long stretch of open country at the base. The slide and a considerable distance from the base are covered with ice. The coasters pass like a comet leaving behind a tail of snow. A speed of seventy miles per hour is frequently attained. Shooting the slide has a fascination that one cannot resist and is an experience that one never forgets. A Chinaman once expressed his opinion thus, "Allee one whizz-whizz, and an hour's walkee allee up hill."

SKIING, A FAVORITE PASTIME, IMPORTED FROM NORWAY

In many parts of Canada a favorite sport is the Norwegian pastime of skiing. The ski consists of a thin piece of ash as long as the wearer can reach upward, and from three to five inches wide. The front is pointed and bent upward to prevent it from cutting into the snow. The foot is firmly fastened to the middle of the ski, and a short pole is used as a balance. In Norway children learn to ski almost as soon as they can walk. Ski jumping is very exciting sport. A long smooth hill is chosen for a course. About one third the distance down, an elevation of about six feet called the hop is built and covered with snow. The jumper starts and when the hop is reached straightens up and sails through the air, touching the hill again several feet from the bottom. The skill consists in continuing the run down hill standing.

ICE YACHTING AND ICE GAMES ARE EXCITING AND ENJOYABLE

Ice yachting is popular in all parts of Canada. Along rivers, lakes and bays you will see fleets of boats. Regattas are held in many places during the winter and valuable prizes are given to the winners. A good boat will skim over the ice at the rate of sixty miles an hour.

Canada boasts of two ice games, hockey and curling. Hockey is the great national game and was borrowed from the Indians. In the handling of the hockey stick and in chasing the puck, Canadians have not found their equals. Curling is a game borrowed from Scotland. It is a favorite pastime from the Atlantic to the Pacific. Every town has its hockey and curling rinks.

There is not another country with such a variety of winter amusements as Canada affords. With skating, coasting, tobogganing, snowshoeing, skiing, ice yachting, hockey and curling, is it any wonder that Canada of all countries in the world is most enjoyable in winter?

THE NEXT STORY OF CANADA IS ON PAGE 5295.

TWO WINTER SPORTS IN MONTREAL

Skis (properly prounounced "shees," but oftener "skees" and sometimes spelled in the same way) are thin strips of wood five to ten feet long, and as you see, pointed at the front and a little turned up. Considerable skill is required to manage them, but one who has learned can make wonderful speed over the snow, particularly when going down-hill. Often men wearing them, when going swiftly, make tremendous leaps through the air. A leap of nearly 193 feet has been known.

The toboggan slide on the west slope of Mount Royal Park is often the scene of gay assemblies during the winter. The slides start from the top of the building in the background and are carried at a sharp angle to the sloping ground. They are occasionally flooded with water, which freezes into absolutely smooth ice, and down them the toboggans whiz with the speed of an express train until checked by rising ground. The sport is exhilarating and not without a spice of danger. It is fine exercise as the tobogganers have to climb the hill through the snow.

Photographs by Notman, Montreal.

THE JOYS OF A CANADIAN WINTER

Ice-boating is a favorite winter sport of Canadians who live near a bay or lake which freezes fast in winter. The boat has a triangular frame on runners, two of which are fixed on a runner-plank, which extends across the widest part of the boat. A third is fastened on a pivot at the stern, and acts as a rudder. The boat is fitted with mast and sails and glides over the ice at an extraordinary rate of speed.

This picture shows the enjoyment of snowshoeing. A snowshoe is an oval-shaped frame of very tough, light wood, filled in with a strongly woven web of rawhide. It looks not unlike a lacrosse stick without the handle, and, as snowshoeing was learned from the Indians, this may have been its origin. The foot is fastened to the snowshoe by strong leather thongs, around instep and ankle, which leave it free.

HEROES OF THE NETHERLANDS

CONTINUED FROM 5096

THE Netherlands were helpless in the sixteenth century, in the grasp of Philip II. of Spain. The brave Dutch inhabitants tried from time to time to shake off the Spanish yoke, but Philip only made matters worse by sending them the cruel Duke of Alva, who was a stern and terrible upholder of his authority.

There were at that time in the Netherlands two friends, Count Lamoral d'Egmont and Count Horn. Egmont was a chivalrous Flemish nobleman and brave soldier, who loved his country, but had sworn loyalty to Philip, and though he was both vain and rash, meant to keep his word, and did so. The army and the people were devoted to him; indeed, he was popular with everyone.

Now, this country of the Netherlands, which we usually call Holland and Belgium now, cherished its liberties and would not be forced into accepting the Catholic religion. Though Counts Egmont and Horn were Catholics, they upheld this determination, and protested against the severity of the Inquisition; so for that, and because he feared their power, Philip determined to put them to death. He soon found a way. Having invited the two counts to dine with his son in Brussels, the Duke of Alva summoned the two to attend a council. There the captain of the guard demanded Egmont's sword, while Horn was arrested in the courtyard. After nine months, they were pronounced guilty of treason, and Philip gladly signed their death warrants. When news of her husband's doom reached the Countess of Egmont, she at once sought the Duke of Alva, and pleaded for the life of her husband, for his sake, for her sake, and for that of their eleven children, who would be left penniless on the confiscation of their father's estates. The cruel duke, to rid himself of her presence, assured her that on the morrow her husband would certainly be released. Yet just before midnight the Bishop of Ypres was sent to prepare Egmont for death.

In that terrible hour the count showed how brave and good he was. Though indignant at being accused of high treason, yet, he said, if he had fallen into error, he prayed God his death might wipe away his misdeeds. He wrote, too, a letter to the king, declaring his loyalty. Next morning as he was led to the scaffold, he prayed aloud for the king, his murderer. Then, as he knelt to receive the fatal stroke, he folded his hands, and cried: "Lord, into Thy hands I commit my spirit." Count Horn was brought forward, and with the same courageous bearing, and the same last prayer, met his death.

HOW LADY GODIVA HELPED HER PEOPLE

WHEN Leofric the Dane was Lord of Coventry, in the year 1040, he heavily increased his taxes on the townsfolk. The people met together and sent their chief men to implore his wife, the Lady Godiva, who was greatly beloved by them for her many gracious acts to the sick and the poor, to plead with her lord to remit some of the heavy taxes.

LADY GODIVA PLEADING WITH HER HUSBAND FOR THE PEOPLE OF COVENTRY
This picture is from the painting by E. Blair Leighton, which now hangs in the City Art Gallery, Leeds.

Accordingly Lady Godiva pleaded with her lord on their behalf, but he roughly refused, saying, "Shameless are you to plead for these base, whining serfs."

"Shameless am I? Then shameless will I be indeed, and we shall see whether these serfs be base or honorable," replied she with spirit. "For I will ride through this town, clad in nought but my long tresses, if I can thus turn you from your cruel purpose."

"Ride thus, and I yield," he replied. Lady Godiva sent out word to the townsfolk of her bargain, and on the following morning she rode from end to end of the town of Coventry, and every inhabitant remained within doors as she rode, to spare their beloved benefactor any possible feeling of shame. Leofric kept his word to his wife. The burden of the people was removed, and to this day the citizens of Coventry delight to do honor to the memory of Lady Godiva.

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